# MAIN HYDRAULIC POWER SYSTEM (NORMAL AND AUXILIARY) -

## INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the main hydraulic power system by flushing the system with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings, as required by the following procedures.

3. Flush Main Hydraulic Power System (See Figure 601.)

   A. Pressure Lines (Engine-Driven Pumps to Dual Filter and Relief Valve)

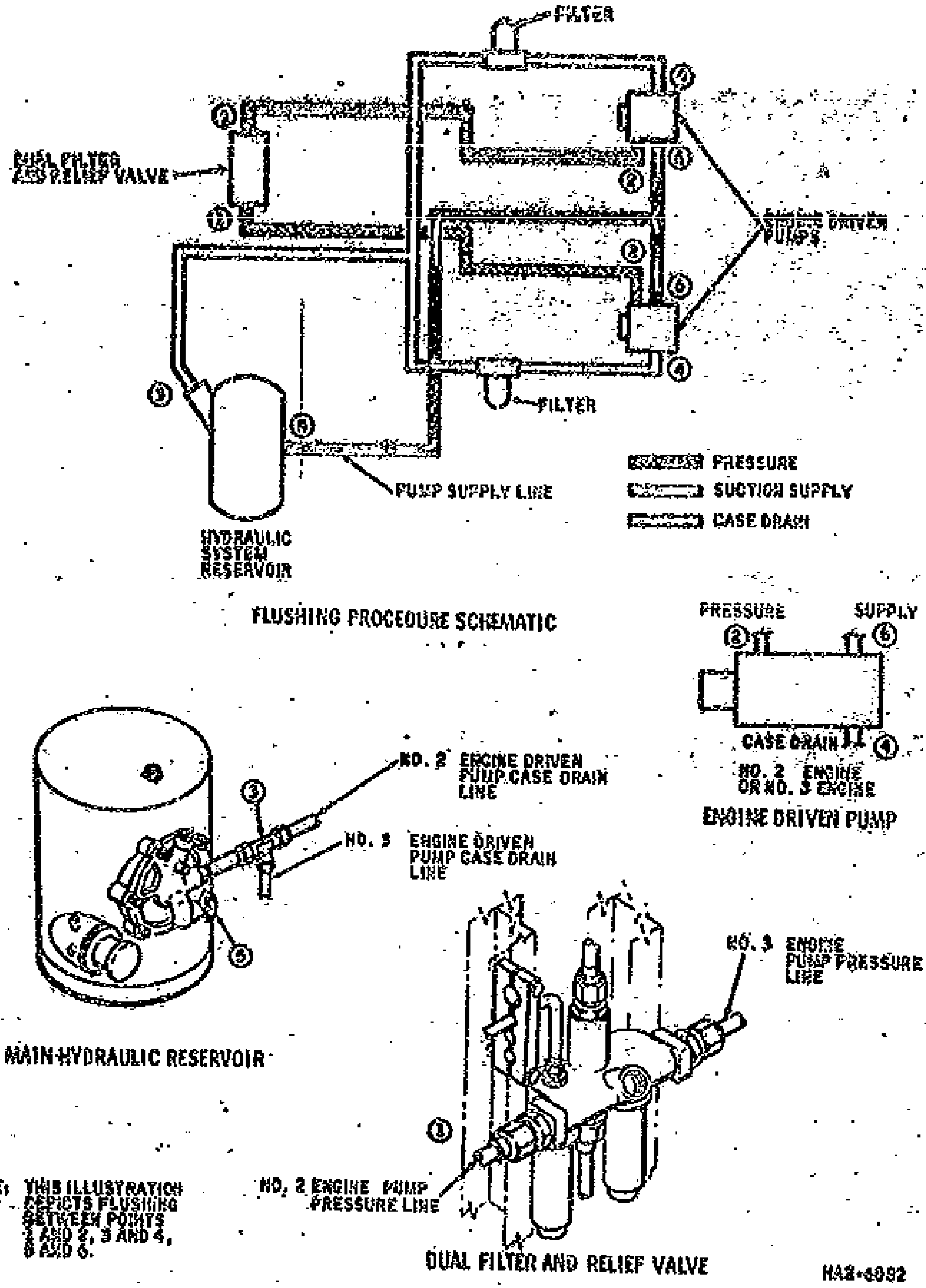
      (1) Disconnect engine-driven hydraulic pump pressure hose from pump in No. 3 pylon.

      (2) Disconnect pressure line from right side of dual filter and relief valve, located in left main gear wheel well.

      (3) At No. 3 pylon, replace check valve, located between engine pump hose and pressure line, with bulkhead fitting.

      (4) Connect engine pump pressure hose to test stand pressure hose, and connect disconnected line at dual filter to test stand return hose.

      (5) Pressurize test stand to 200 psi at 5 to 20 gpm fluid flow.




Flushing Procedure Line Connection Locations
Figure 601

(6) Flush circuit for five minutes.

(7) Depressurize test stand.

(8) Repeat steps (1 through 7) for pressure line between dual filter and No. 2 engine pump.

(9) Remove dual filter and relief valve filter elements, clean filter bowls, and install clean filter elements (see 29-10-17).

(10) Inspect, clean, and/or replace check valves.

(11) Restore all lines and units to original configuration.

B. Case Drain Lines

(1) Disconnect case drain hose from engine-driven pump in No. 3 pylon. Connect hose to hydraulic test stand pressure hose.

(2) At No. 3 pylon, replace check valve between engine-driven pump hose and case drain line with bulkhead fitting.

(3) At tee fitting, located in low-pressure return line adjacent to reservoir return port (see Figure 601), disconnect No. 2 engine pump case drain line. Cap tee fitting.

(4) Disconnect case drain line from low-pressure return port in reservoir, and connect this line to test stand return hose. Cap reservoir port.

(5) Disconnect lines from both sides of case drain filter and check valve, and jumper these return lines.

(6) Pressurize test stand to 200 psi maximum, at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Repeat steps (1 and 2) for engine pump in No. 2 pylon.

(10) Connect No. 2 engine pump case drain line, which was disconnected in step (3), to hydraulic test stand return hose.

(11) Repeat step (5) for No. 2 engine case drain filter and check valve.

(12) Repeat steps (6 through 8) for No. 2 engine pump case drain lines.

(13) Clean filter bowls and replace filter elements in case drain filters, located on rear spar (see 29-10-15).

(14) Inspect, clean, and/or replace shock valves.

(15) Restore all lines and units to original configuration.

C. Reservoir and Suction System

(1) Do not disconnect or remove large reducer tee fitting and connecting supply lines from reservoir.

(2) Connect hydraulic test stand return hose to airplane ground service supply connection (see Figure 602).

(3) Drain reservoir, remove reservoir filter element (see 29-10-2). Clean out reservoir.

(4) Temporarily install reservoir filter cover plate with all return ports plugged.

(5) Disconnect aspirator line at reservoir end. Cap reservoir end and cap reservoir port.

(6) Disconnect suction hose from No. 2 engine-driven pump and connect test stand pressure hose to suction hose.

(7) Open fire shutoff valve on No. 2 engine.

(8) Disconnect and cap outboard flap return lines and port connectors where they connect to suction lines on rear spar, aft of No. 2 and No. 3 pylons (see Figure 602).

(9) Pressurize test stand to 45 psi at 20 gpm flow.

(10) Flush from engine pump suction hose to reservoir for five minutes.

CAUTION: WHEN FLUSHING THE SUPPLY LINES, MONITOR THE RESERVOIR FLUID LEVEL AND THE AIR PRESSURE GAGE ON TOP OF THE RESERVOIR AIR BLEED VALVE. THE FLUID LEVEL MUST BE VISIBLE IN THE SIGHT GAGE, AND THE PRESSURE MUST NOT EXCEED 45 PSI TO PREVENT DAMAGE TO THE RESERVOIR.

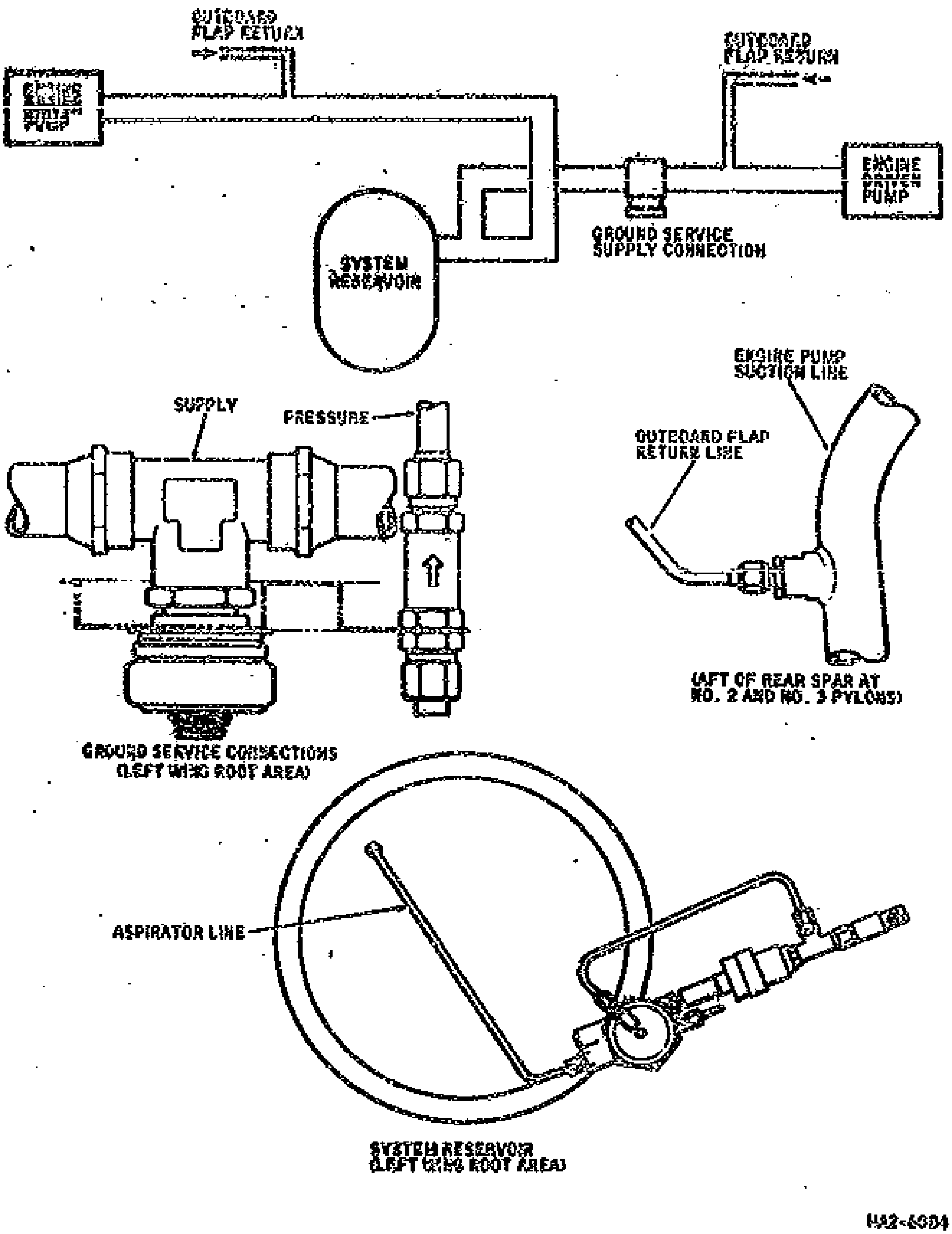
(11) Depressurize test stand.

(12) Close No. 2 and No. 3 engine fire shutoff valve.

(13) Remove test stand pressure hose from No. 2 engine pump supply line, and connect No. 3 engine-driven pump supply line. Open No. 3 engine fire shutoff valve.

(14) Repeat steps (9 through 11).

(15) Close No. 3 engine fire shutoff valve and disconnect test stand from engine-driven pump suction supply hose.




Flushing Procedure Line Connection Locations
Figure 602

(16) Uncap aspirator line and reservoir aspirator port. Connect aspirator line to reservoir.

(17) Uncap outboard flap return lines and return line ports in pump suction lines and connect flap return lines to suction lines.

(18) Flush main hydraulic reservoir, air chamber, and associated lines as follows:

(a) Disconnect line which runs from air chamber to reservoir air relief valve, located downstream of air bleed valve in left wheel well (see Figure 603).

(b) Connect this line to test stand pressure hose.

(c) At same location, disconnect vent line which runs to tee fitting in reservoir filler neck. Cap line.

(d) At filler neck, disconnect both vent lines and connect together with jumper line.

(e) At tee in filler line, disconnect line which runs to high standpipe port at bottom of main reservoir (see Figure 604). Cap tee fitting and connect disconnected line to test stand return hose.

(f) Pressurize test stand to 45 psi maximum at 20 gpm flow.

(g) Flush circuit for five minutes.

(19) Depressurize test stand.

(20) Disconnect test stand pressure hose from overboard line and cap this line. Connect test stand pressure hose to vent line that was capped in step (18, c).

(21) Repeat steps (18, f and g).

(22) Depressurize test stand, drain and clean out reservoir. Install new reservoir filter element (see 29-10-2).

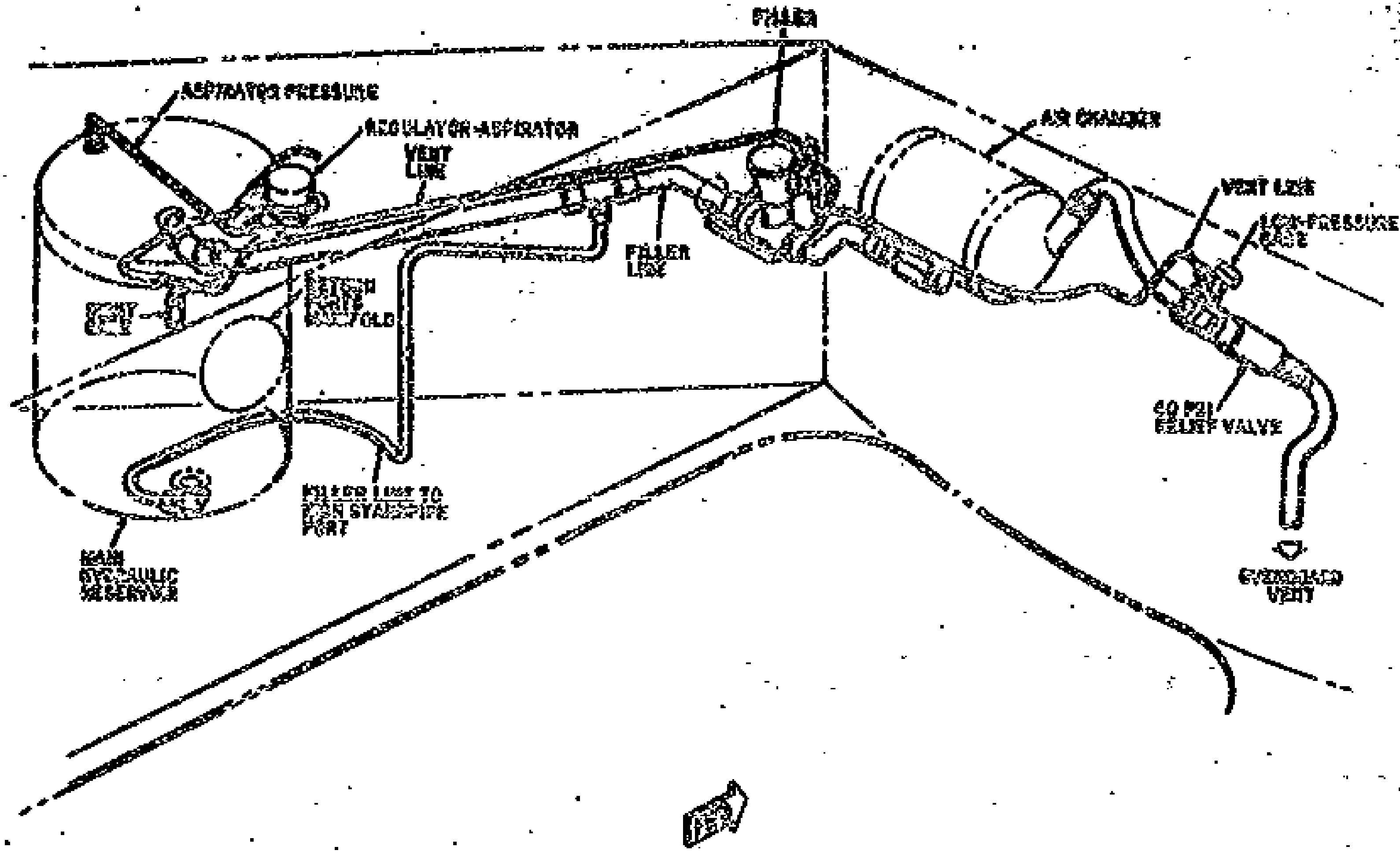
(23) Restore all lines and units to original configuration.

D. Auxiliary Hydraulic System Alternate Reservoir

NOTE: The auxiliary pump alternate reservoir may be contaminated by the wing flap return line, the auxiliary pump bypass line, or the low-pressure return lines that tie into the wing flap lines.

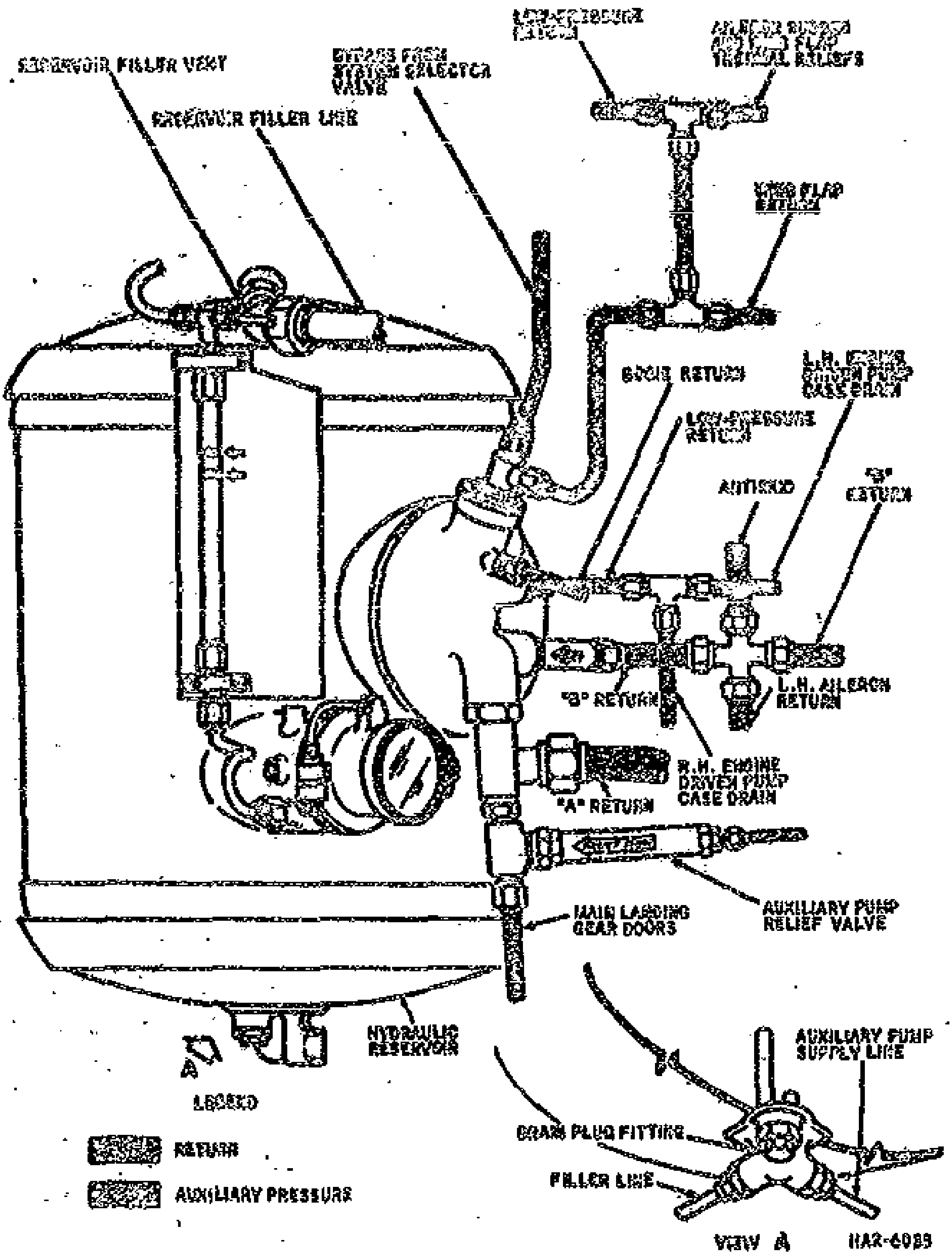
(1) Disconnect wing flap return line from tee fitting upstream of low pressure return line (see Figure 604). Cap tee.

(2) Connect wing flap return line to test stand pressure hose.

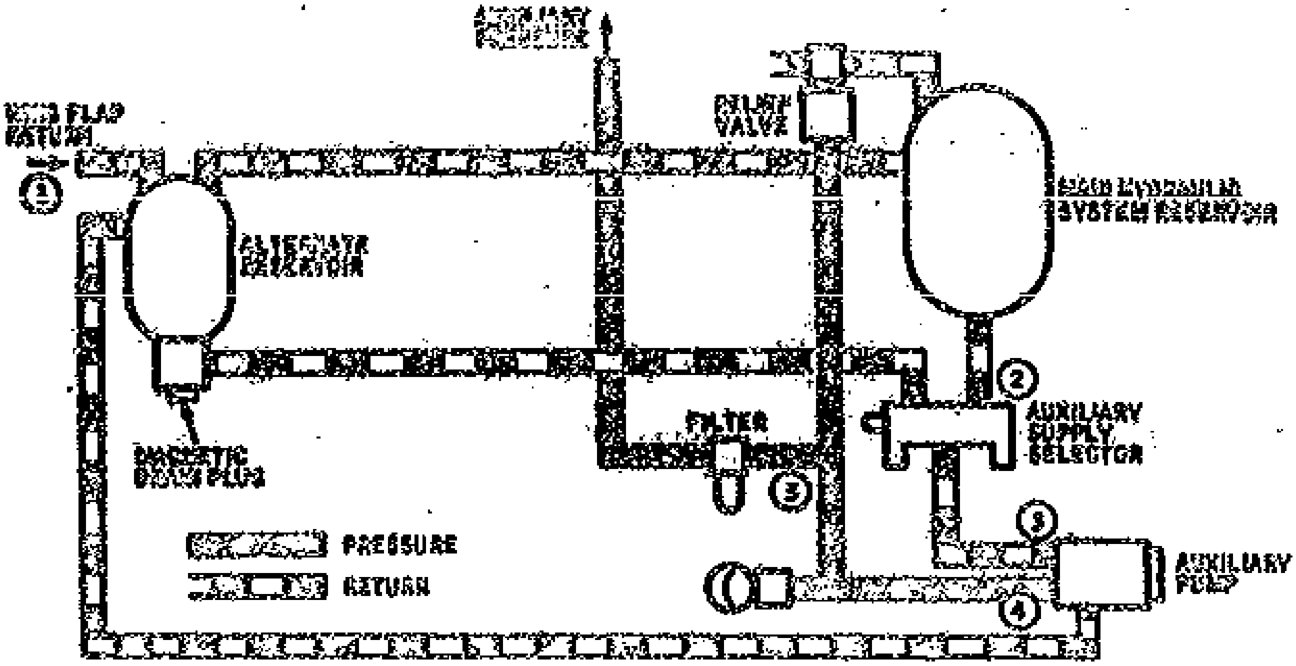



LEFT WHEEL WELL

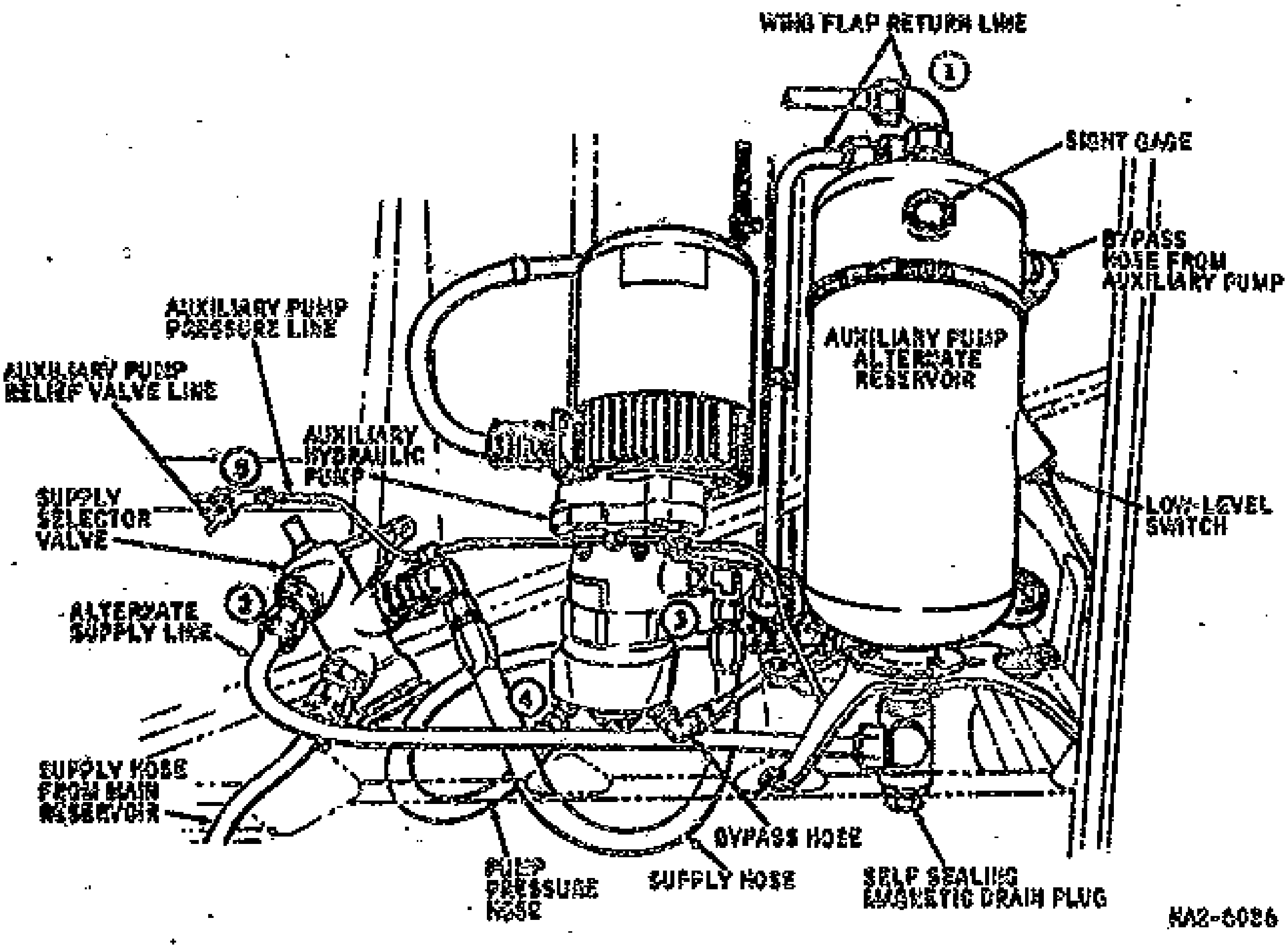
Flushing Procedure Connection Locations
Figure 603




Flushing Procedure Connection Locations
Figure 604




AUXILIARY HYDRAULIC PUMP SYSTEM




HA2-6086

Flushing Procedure Line Connection Locations
Figure 605

(3) Disconnect alternate supply line from supply selector valve. Connect line to test stand return hose (see Figure 605).

(4) Pressurize test stand to 100 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand, and drain alternate reservoir (see 29-00, Maintenance Practices).

(7) Restore all lines to original configuration.

B. Auxiliary Hydraulic Pump System (See Figures 604 and 605.)

(1) Disconnect auxiliary pump supply line from low standpipe port in bottom of main reservoir. Cap reservoir port, and connect line to test stand pressure hose.

(2) Place hydraulic system selector control lever in general system (normal) position.

(3) Disconnect auxiliary pump supply and pressure hoses from pump. Connect these two lines together.

(4) Disconnect auxiliary pump pressure line, and relief valve line from tee fitting located adjacent to auxiliary supply selector valve. Connect these lines together.

(5) Disconnect auxiliary pump relief valve inlet line from relief valve, located near A-return line of main reservoir. Connect line to test stand return hose.

(6) Pressurize test stand to 100 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Disconnect test stand pressure hose from auxiliary pump supply hose, and connect to supply selector valve alternate supply port.

(10) Place hydraulic system selector control lever in No. 3 position, and repeat steps (6 through 8).

(11) Remove auxiliary hydraulic pump case drain hose. Clean, and/or replace.

(12) Remove auxiliary pump filter element, clean filter bowl. Install clean filter element (see 29-10-5).

(13) Restore all lines and units to original configuration.

# MAIN HYDRAULIC POWER SYSTEM (NORMAL AUXILIARY) -

# INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the main hydraulic power system by flushing the system with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings, as required by the following procedures.

3. Flush Main Hydraulic Power System (See Figure 601.)

   A. Pressure Lines (Engine-Driven Pumps to Dual Filter and Relief Valve)

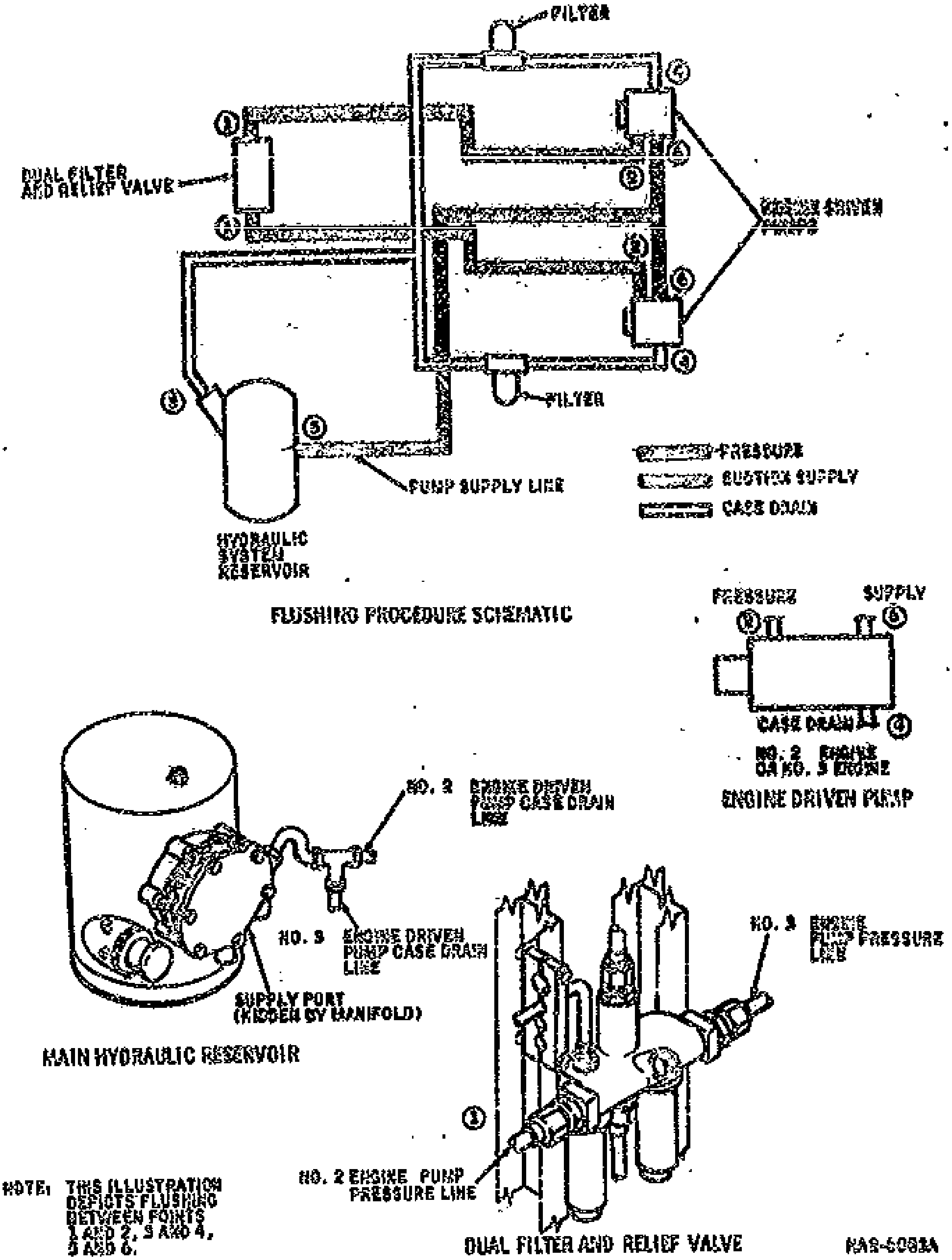
      (1) Disconnect engine-driven hydraulic pump pressure hose from pump in No. 3 pylon.

      (2) Disconnect pressure line from right side of dual filter and relief valve, located in left main gear wheel well.

      (3) At No. 3 pylon, replace check valve, located between engine pump hose and pressure line, with bulkhead fitting.

      (4) Connect engine pump pressure hose to test stand pressure hose, and connect disconnected line at dual filter to test stand return hose.

      (5) Pressurize test stand to 200 psi at 5 to 20 gpm fluid flow.




Flushing Procedure Line Connection Locations
Figure 601

(6) Flush circuit for five minutes.

(7) Depressurize test stand.

(8) Repeat steps (1 through 7) for pressure line between dual filter and No. 2 engine pump.

(9) Remove dual filter and relief valve filter elements, clean filter bowls, and install clean filter elements (see 29-10-17).

(10) Inspect, clean and/or replace check valves.

(11) Restore all lines and units to original configuration.

B. Case Drain Lines

(1) Disconnect case drain hose from engine-driven pump in No. 3 pylon. Connect hose to hydraulic test stand pressure hose.

(2) At No. 3 pylon, replace check valve between engine-driven pump hose and case drain line with bulkhead fitting.

(3) At tee fitting, located in B-return line adjacent to reservoir return port (see Figure 601), disconnect No. 2 engine pump case drain line. Cap tee fitting.

(4) Disconnect case drain line from case drain return port in reservoir, and connect this line to test stand return hose. Cap reservoir port.

(5) Disconnect lines from both sides of case drain filter and check valve, and jumper these return lines.

(6) Pressurize test stand to 200 psi maximum, at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Repeat steps (1 and 2) for engine pump in No. 2 pylon.

(10) Connect No. 2 engine-pump case drain line, which was disconnected in step (3), to hydraulic test stand return hose.

(11) Repeat step (5) for No. 2 engine case drain filter and check valve.

(12) Repeat steps (6 through 8) for No. 2 engine pump case drain lines.

(13) Clean filter bowls and replace filter elements in case drain filters, located on rear spar (see 29-10-15).

(14) Inspect, clean, and/or replace check valves.

(15) Restore all lines and units to original configuration.

Q. Reservoir and Suction System

(1) Do not disconnect or remove large reducer tee fitting and connecting supply lines from reservoir.

(2) Connect hydraulic test stand return hose to airplane ground service supply connection (see Figure 602).

(3) Drain reservoir, remove reservoir filter element (see 29-10-2). Clean out reservoir.

(4) Temporarily install reservoir filter cover plate. Disconnect and cap all return ports.

(5) Disconnect aspirator line at reservoir end. Cap reservoir end and cap reservoir port.

(6) Disconnect suction hose from No. 2 engine-driven pump and connect test stand pressure hose to suction hose.

(7) Open fire shutoff valve on No. 2 engine.

(8) Disconnect and cap outboard flap return lines and port connectors where they connect to suction lines on rear spar aft of No. 2 and No. 3 pylons. (see Figure 602).

(9) Pressurize test stand to 45 psi at 20 gpm flow.

(10) Flush from engine pump suction hose to reservoir for five minutes.

CAUTION: WHEN FLUSHING THE SUPPLY LINES, MONITOR THE RESERVOIR FLUID LEVEL AND THE AIR PRESSURE GAGE ON TOP OF THE RESERVOIR AIR BLEED VALVE. THE FLUID LEVEL MUST BE VISIBLE IN THE SIGHT GAGE, AND THE PRESSURE MUST NOT EXCEED 45 PSI TO PREVENT DAMAGE TO THE RESERVOIR.

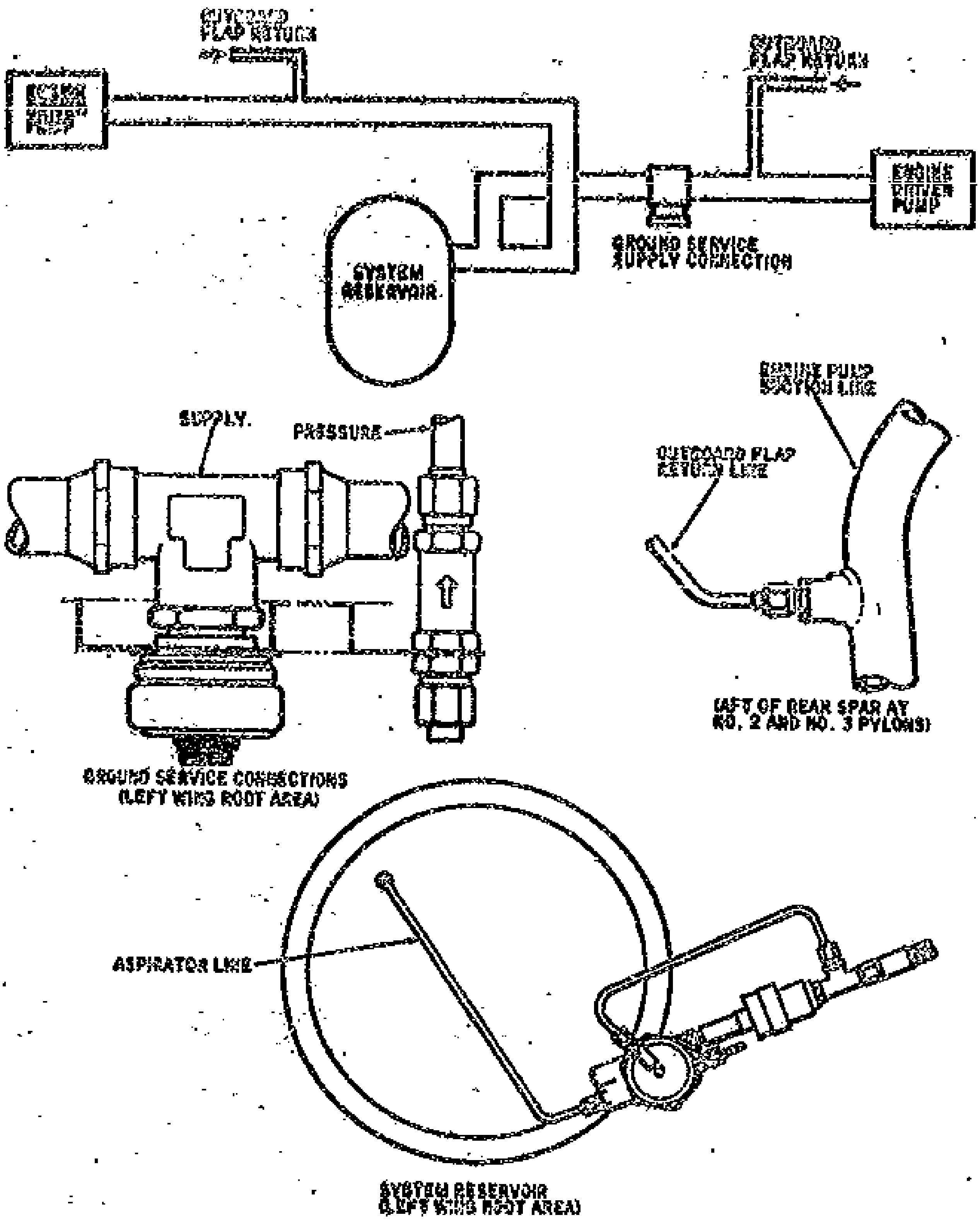
(11) Depressurize test stand.

(12) Close No. 2 and No. 3 engine fire shutoff valve.

(13) Remove test stand pressure hose from No. 2 engine pump supply line, and connect No. 3 engine-driven pump supply line. Open No. 3 engine fire shutoff valve.

(14) Repeat steps (9 through 11).

(15) Close No. 3 engine fire shutoff valve and disconnect test stand from engine-driven pump suction supply hose.




KAS-6004

Flushing Procedure-Line Connection Locations
Figure 602

(16) Uncap aspirator line and reservoir aspirator port. Connect aspirator line to reservoir.

(17) Uncap outboard flap return lines and return line ports in pump suction lines and connect flap return lines to suction lines.

(18) Flush main hydraulic reservoir, air chamber, and associated lines as follows:

(a) Disconnect line which runs from air chamber to reservoir air relief valve, located downstream of air bleed valve in left wheel well (see Figure 603).

(b) Connect this line to test stand pressure hose.

(c) At same location disconnect vent line which runs to tee fitting in reservoir filler neck. Cap line.

(d) At filler neck, disconnect both vent lines and connect together with jumper line.

(e) At tee in filler line, disconnect line which runs to high standpipe port at bottom of main reservoir (see Figure 604). Cap tee fitting and connect disconnected line to test stand return hose.

(f) Pressurize test stand to 45 psi maximum at 20 gpm flow.

(g) Flush circuit for five minutes.

(19) Depressurize test stand.

(20) Disconnect test stand pressure hose from overboard line and cap this line. Connect test stand pressure hose to vent line that was capped in step 18, c).

(21) Repeat steps (18, f and g).

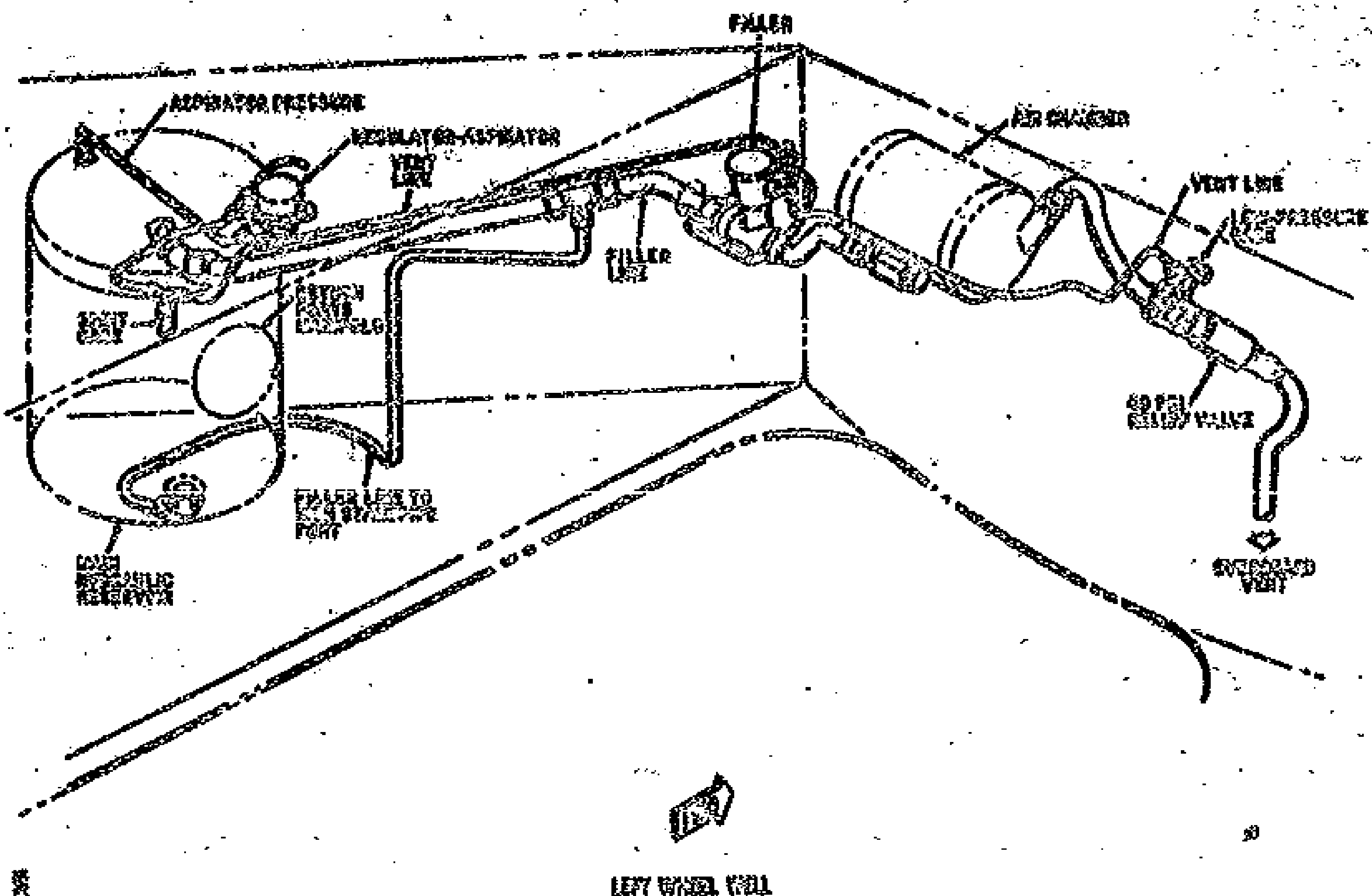
(22) Depressurize test stand, drain and clean out reservoir. Install new reservoir filter element (see 29-10-2).

(23) Restore all lines and units to original configuration.

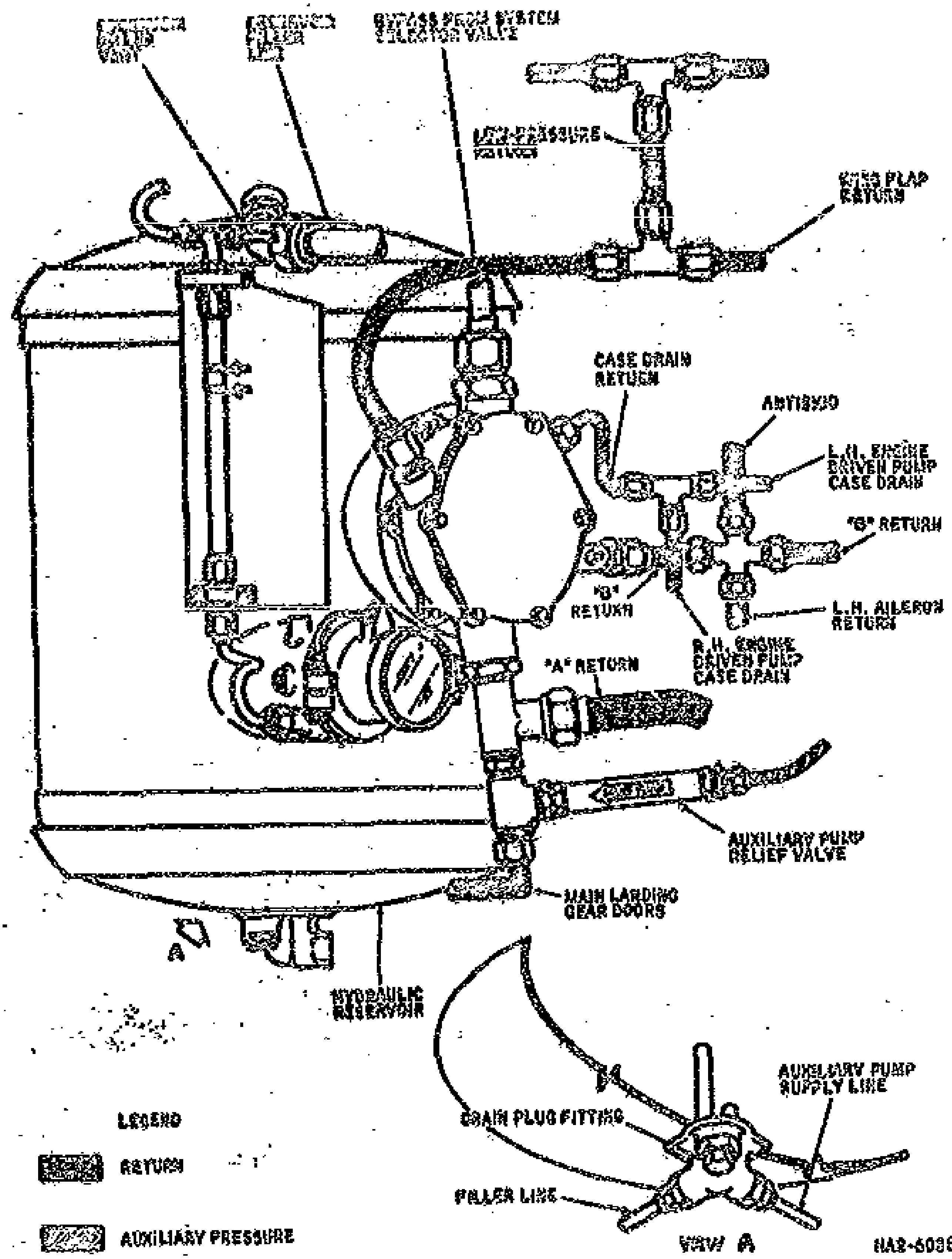
D. Auxiliary Hydraulic System Alternate Reservoir

NOTE: The auxiliary pump alternate reservoir may be contaminated by the wing flap return line, the auxiliary pump bypass line, or the low-pressure return lines that tie into the wing flap lines.

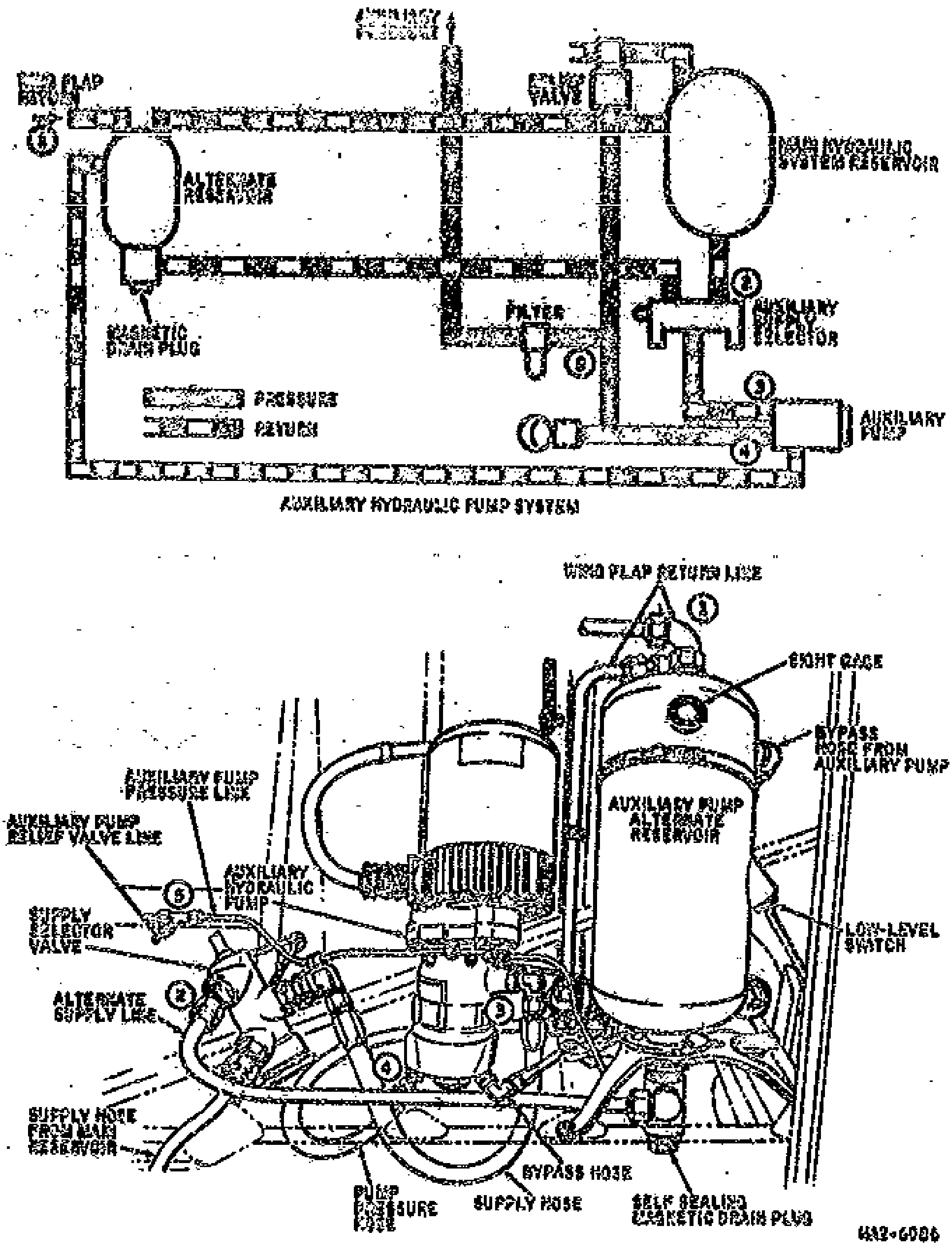
(1) Disconnect wing flap return line from tee fitting upstream of low pressure return line (see Figure 604). Cap tee.




Flushing Procedure Connection Locations
Figure 603




Flushing Procedure Connection Locations
Figure 604




Flushing Procedure Line Connection Locations
Figure 605

(2) Connect wing flap return line to test stand pressure hose.

(3) Disconnect alternate supply line from supply selector valve. Connect line to test stand return hose (see Figure 605).

(4) Pressurize test stand to 100 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand, and drain alternate reservoir (see 29-00, Maintenance Practices).

(7) Restore all lines to original configuration.

E. Auxiliary Hydraulic Pump System (See Figures 604 and 605.)

(1) Disconnect auxiliary pump supply line from low standpipe port in bottom of main reservoir. Cap reservoir port, and connect line to test stand pressure hose.

(2) Place hydraulic system selector control lever in general system (normal) position.

(3) Disconnect auxiliary pump supply and pressure hoses from pump. Connect these two lines together.

(4) Disconnect auxiliary pump pressure line, and relief valve line from tee fitting located adjacent to auxiliary supply selector valve. Connect these lines together.

(5) Disconnect auxiliary pump relief valve inlet line from relief valve, located near A-return line of main reservoir. Connect line to test stand return hose.

(6) Pressurize test stand to 100 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Disconnect test stand pressure hose from auxiliary pump supply hose, and connect to supply selector valve alternate supply port.

(10) Place hydraulic system selector control lever in No. 3 position, and repeat steps (6 through 8).

(11) Remove auxiliary hydraulic pump case drain hose. Clean and/or replace.

(12) Remove auxiliary pump filter element, clean filter bowl. Install clean filter element (see 29-10-5).

(13) Restore all lines and units to original configuration.

MAIN HYDRAULIC POWER SYSTEM (NORMAL AND AUXILIARY) -

INSPECTION/CHECK

1. General

A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the main hydraulic power system by flushing the system with clean hydraulic fluid.

B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

C. The removal of overheated or diluted fluid would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

D. Before or flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

B. Pressure and return hoses, jumper lines, and fittings, as required by the following procedures.

3. Flush Main Hydraulic Power System (See Figure 601.)

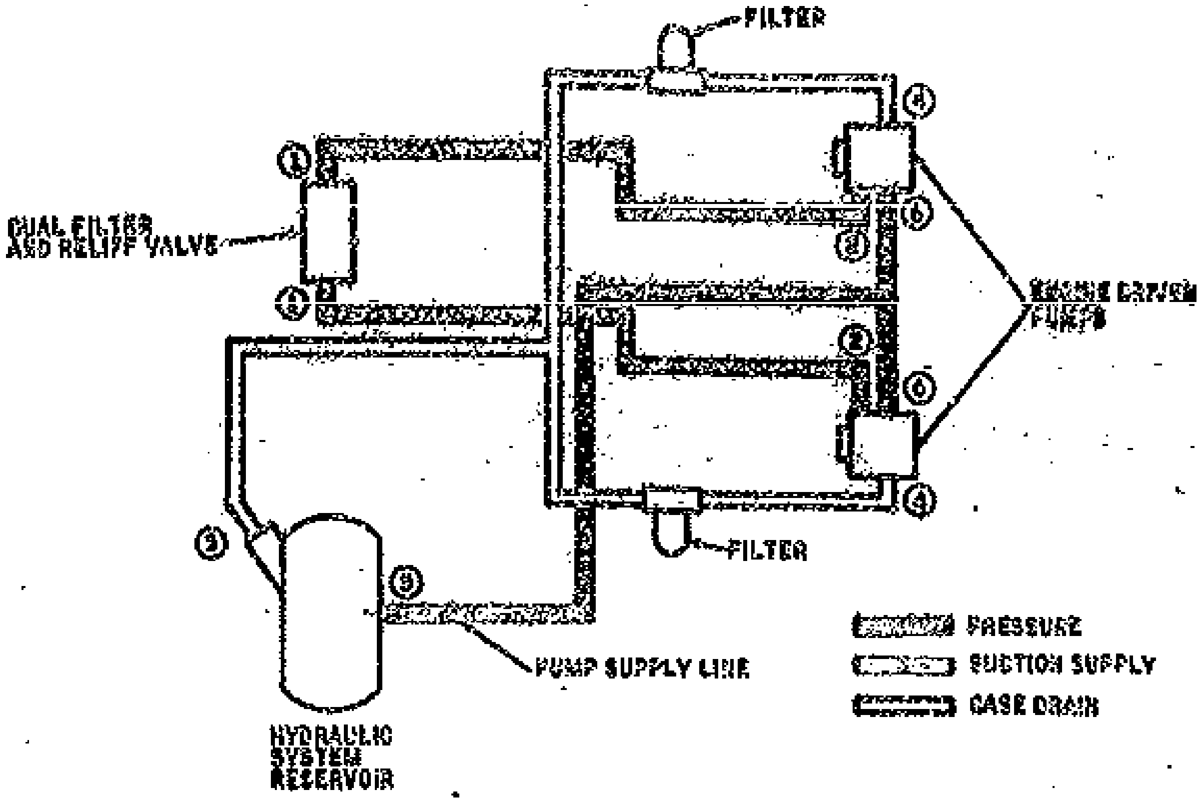
A. Pressure Lines (Engine-Driven Pumps to Dual Filter and Relief Valve)

(1) Disconnect engine-driven hydraulic pump pressure hose from pump in No. 3 pylon.

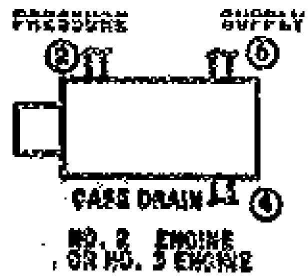
(2) Disconnect pressure line from right side of dual filter and relief valve, located in left main gear wheel well.

(3) At No. 3 pylon, replace check valve, located between engine pump hose and pressure line, with bulkhead fitting.

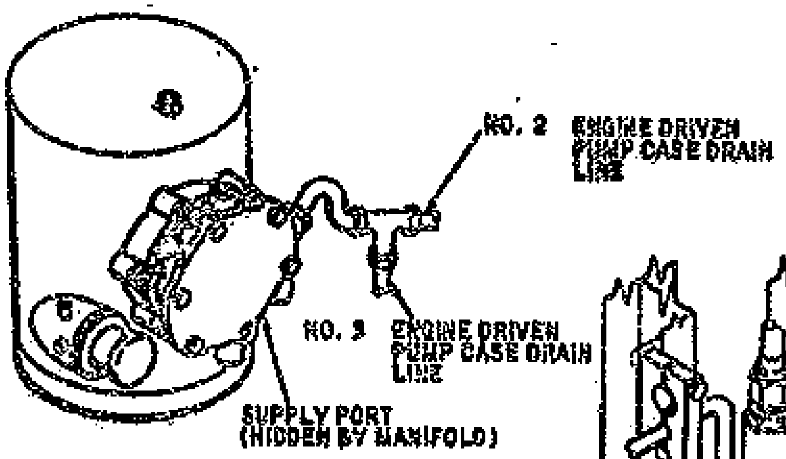
(4) Connect engine pump pressure hose to test stand pressure hose, and connect disconnected line at dual filter to test stand return hose.



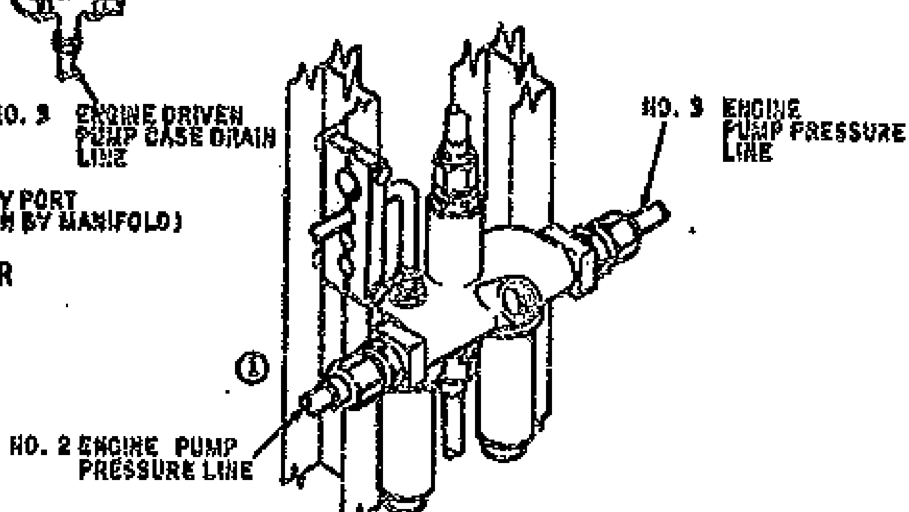

FLUSHING PROCEDURE SCHEMATIC




ENGINE DRIVEN PUMP




MAIN HYDRAULIC RESERVOIR




DUAL FILTER AND RELIEF VALVE

NOTE: THIS ILLUSTRATION DEPICTS FLUSHING BETWEEN POINTS 1 AND 2, 3 AND 4, 5 AND 6.

HA2-600AA

Flushing Procedure Line Connection Locations

(5) Pressurize test stand to 200 psi at 5 to 20 gpm fluid flow.

(6) Flush circuit for five minutes.

(7) Depressurize test stand.

(8) Repeat Steps (1 through 7) for pressure line between dual filter and Number 2 engine pump.

(9) Remove dual filter and relief valve filter elements, clean filter bowls, and install clean filter elements (see 29-10-17).

(10) Inspect, clean, and/or replace check valves.

(11) Restore all lines and units to original configuration.

B. Case Drain Lines

(1) Disconnect case drain hose from engine-driven pump in No. 3 pylon. Connect hose to hydraulic test stand pressure hose.

(2) At No. 3 pylon, replace check valve between engine-driven pump hose and case drain line with bulkhead fitting.

(3) At tee fitting, located in B-return line adjacent to reservoir return port (see Figure 601), disconnect No. 2 engine pump case drain line. Cap tee fitting.

(4) Disconnect case drain line from case drain return port in reservoir, and connect this line to test stand return hose. Cap reservoir port.

(5) Disconnect lines from both sides of case drain filter and check valve, and jumper these return lines.

(6) Pressurize test stand to 200 psi maximum, at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Repeat Steps (1 and 2) for engine pump in No. 2 pylon.

(10) Connect No. 2 engine pump case drain line, which was disconnected in Step (3), to hydraulic test stand return hose.

(11) Repeat Step (5) for No. 2 engine case drain filter and check valve.

(12) Repeat Steps (6 through 8) for No. 2 engine pump case drain lines.

(13) Clean filter bowls and replace filter elements in case drain filters, located on rear spar (see 29-10-15).

(14) Inspect, clean, and/or replace check valves.

(15) Restore all lines and units to original configuration.

C. Reservoir and Suction System

(1) Do not disconnect or remove large reducer tee fitting and connecting supply lines from reservoir.

(2) Connect hydraulic test stand return hose to airplane ground service supply connection (see Figure 602).

(3) Drain reservoir, remove reservoir filter element (see 29-10-2). Clean out reservoir.

(4) Temporarily install reservoir filter cover plate. Disconnect and cap all return ports.

(5) Disconnect aspirator line at reservoir end. Cap reservoir end and cap reservoir port.

(6) Disconnect suction hose from No. 2 engine-driven pump and connect test stand pressure hose to suction hose.

(7) Open fire shutoff valve on No. 2 engine.

(8) Disconnect and cap outboard flap return lines and port connectors where they connect to suction lines on rear spar aft of No. 2 and No. 3 pylons. (see Figure 602).

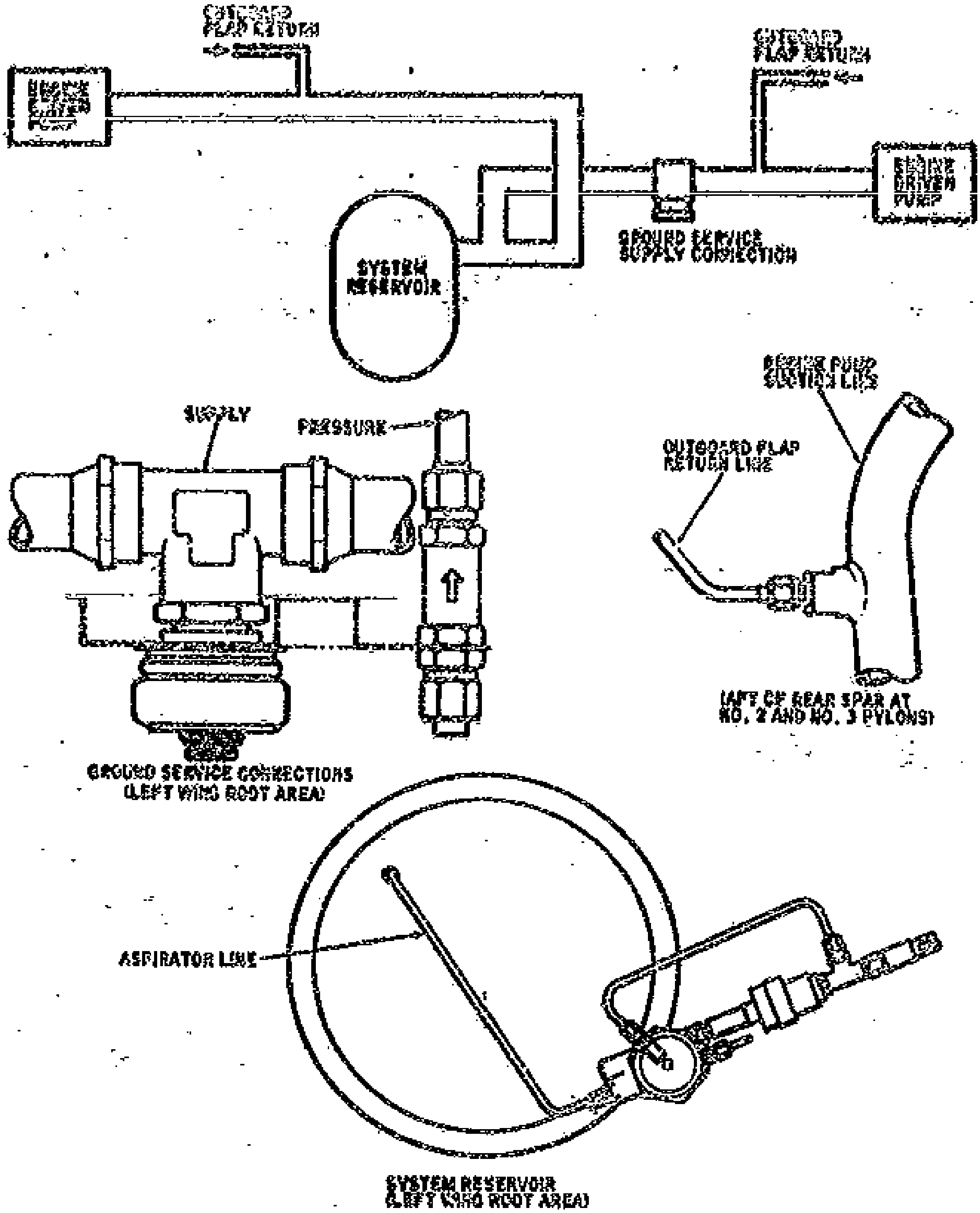
(9) Pressurize test stand to 45 psi at 20 gpm flow.

(10) Flush from engine pump suction hose to reservoir for five minutes.

<u>CAUTION:</u> WHEN FLUSHING THE SUPPLY LINES, MONITOR THE RESERVOIR FLUID LEVEL AND THE AIR PRESSURE GAGE ON TOP OF THE RESERVOIR AIR BLEED VALVE. THE FLUID LEVEL MUST BE VISIBLE IN THE SIGHT GAGE, AND THE PRESSURE MUST NOT EXCEED 45 PSI TO PREVENT DAMAGE TO THE RESERVOIR.

(11) Depressurize test stand.

(12) Close No. 2 and No. 3 engine fire shutoff valve.




HA2-6084

Flushing Procedure Line Connection Locations
Figure 602

(13) Remove test stand pressure hose from No. 2 engine pump supply line, and connect number 3 engine-driven pump supply line. Open No. 3 engine fire shutoff valve.

(14) Repeat Steps (9 through 11).

(15) Close No. 3 engine fire shutoff valve and disconnect test stand from engine-driven pump suction supply hose.

(16) Uncap aspirator line and reservoir aspirator port. Connect aspirator line to reservoir.

(17) Uncap outboard flap return lines and return line ports in pump suction lines and connect flap return lines to suction lines.

(18) Flush main hydraulic reservoir, air chamber, and associated lines as follows:

(a) Disconnect line which runs from air chamber to reservoir air relief valve, located downstream of air bleed valve in left wheel well (see Figure 603).

(b) Connect this line to test stand pressure hose.

(c) At same location, disconnect vent line which runs to tee fitting in reservoir filler neck. Cap line.

(d) At filler neck, disconnect both vent lines and connect together with jumper line.

(e) At tee in filler line, disconnect line which runs to high standpipe port at bottom of main reservoir (see Figure 604). Cap tee fitting and connect disconnected line to test stand return hose.

(f) Pressurize test stand to 45 psi maximum at 20 gpm flow.

(g) Flush circuit for five minutes.

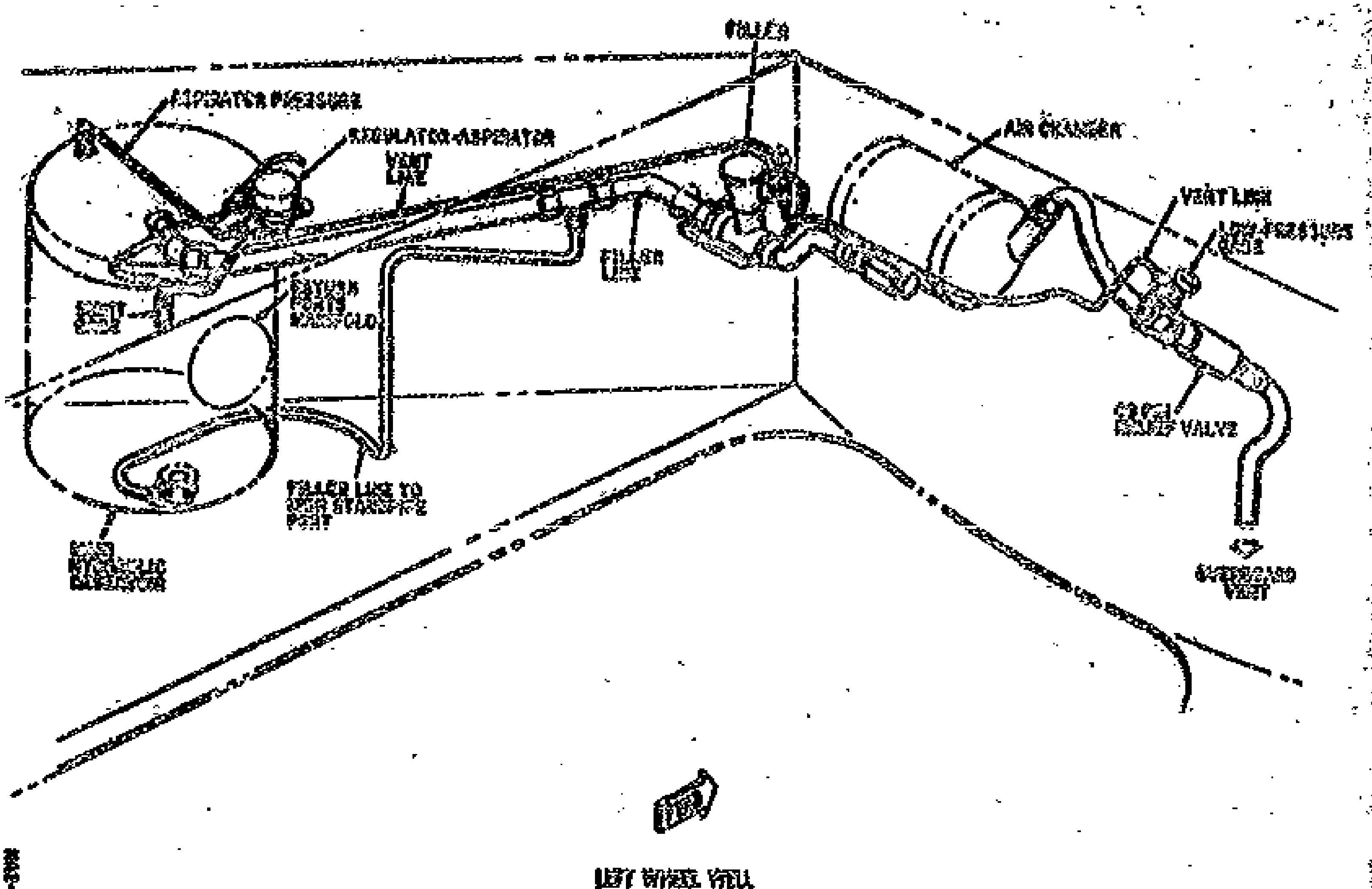
(19) Depressurize test stand.

(20) Disconnect test stand pressure hose from overboard line and cap this line. Connect test stand pressure hose to vent line that was capped in Step (18, c).

(21) Repeat Steps (18, f and g).

(22) Depressurize test stand, drain and clean out reservoir. Install new reservoir filter element (see 29-10-2).

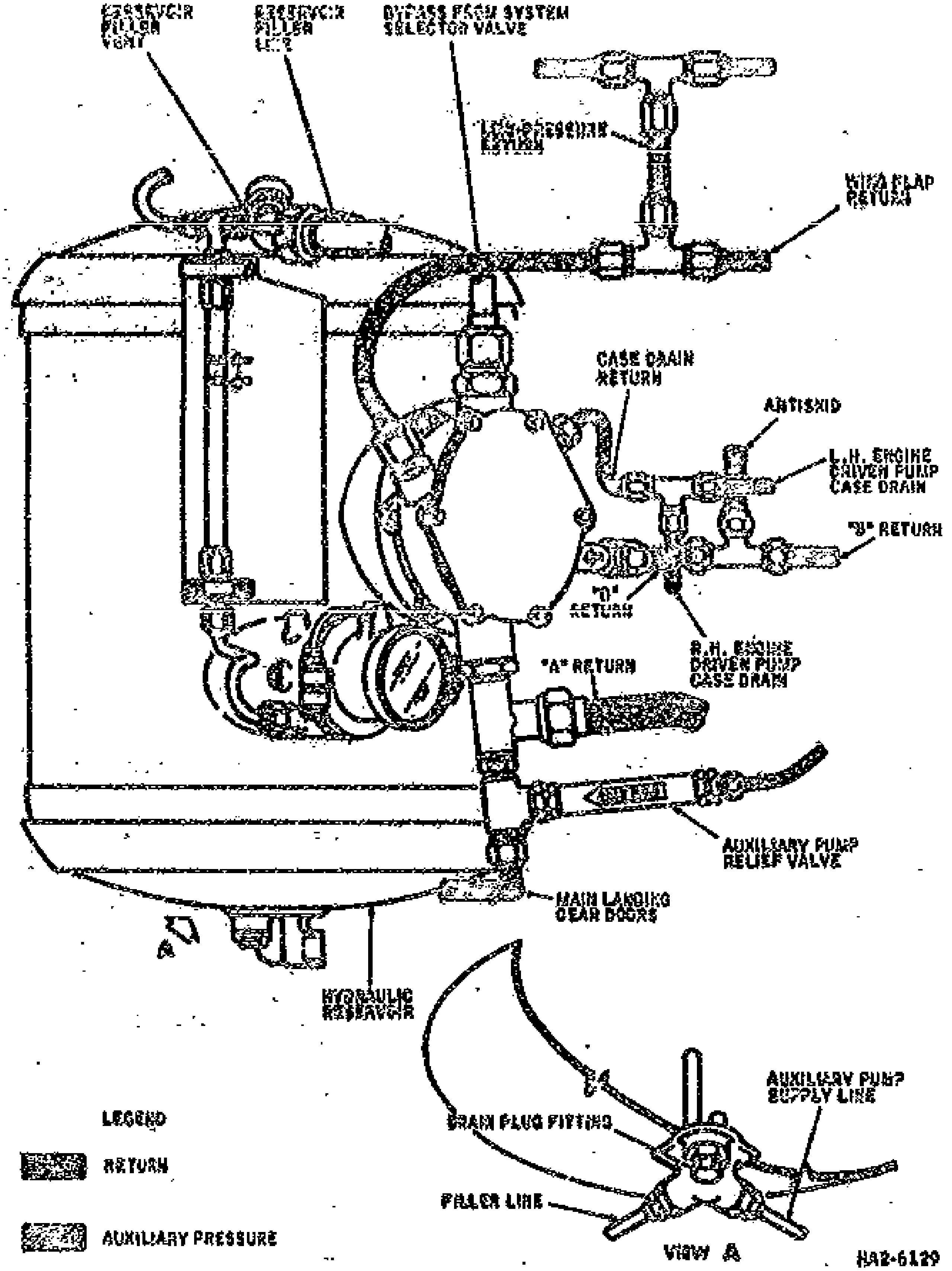
(23) Restore all lines and units to original configuration.




Flushing Procedure Connection Locations
Figure 603



Printed in U.S.A.




Flushing Procedure Connection Locations
Figure 604

D. Auxiliary Hydraulic System Alternate Reservoir

NOTE: The auxiliary pump alternate reservoir may be contaminated by the wing flap return line, the auxiliary pump case drain line, or the low-pressure return lines that tie into the wing flap lines.

(1) Disconnect wing flap return line from tee fitting upstream of low pressure return line (see Figure 604). Cap tee.

(2) Connect wing flap return line to test stand pressure hose.

(3) Disconnect alternate supply line from supply selector valve. Connect line to test stand return hose (see Figure 605).

(4) Pressurize test stand to 100 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand, and drain alternate reservoir (see 29-00, Maintenance Practices).

(7) Restore all lines to original configuration.

E. Auxiliary Hydraulic Pump System (See Figures 604 and 605.)

(1) Disconnect auxiliary pump supply line from low standpipe port in bottom of main reservoir. Cap reservoir port, and connect line to test stand pressure hose.

(2) Place hydraulic system selector control lever in general system (normal) position.

(3) Disconnect auxiliary pump supply and pressure hoses from pump. Connect these two lines together.

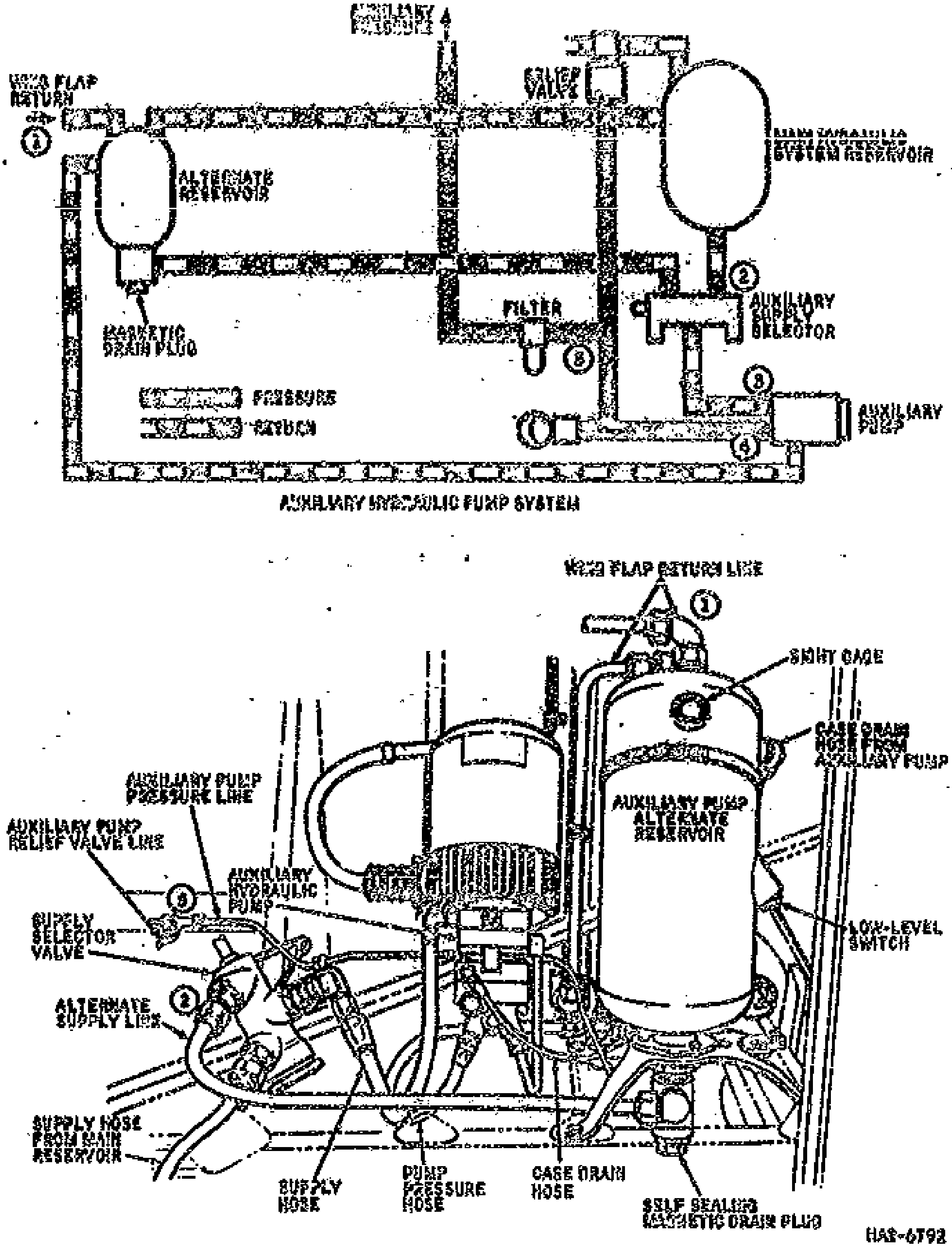
(4) Disconnect auxiliary pump pressure line, and relief valve line from tee fitting located adjacent to auxiliary supply selector valve. Connect these lines together.

(5) Disconnect auxiliary pump relief valve inlet line from relief valve, located near A-return line of main reservoir. Connect line to test stand return hose.

(6) Pressurize test stand to 100 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.




Flushing Procedure Line Connection Locations
Figure 605

(9) Disconnect test stand pressure hose from auxiliary pump supply hose, and connect to supply selector valve alternate supply port.

(10) Place hydraulic system selector control lever in No. 3 position, and repeat Steps (6 through 8).

(11) Remove auxiliary hydraulic pump case drain hose. Clean, and/or replace.

(12) Remove auxiliary pump filter element, clean filter bowl. Install clean filter element (see 29-10-5).

(13) Restore all lines and units to original configuration.

MAIN HYDRAULIC POWER SYSTEM (BEYOND DUAL FILTER AND RELIEF VALVE) -

INSPECTION/CHECK

1. General

A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the main hydraulic power system by flushing the systems with clean hydraulic fluid.

B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid and fitted with 10-micron or smaller filter.

B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Main Hydraulic Power System (Beyond Dual Filter and Relief Valve)

A. Regulator-Aspirator Pressure Line (See Figure 601.)

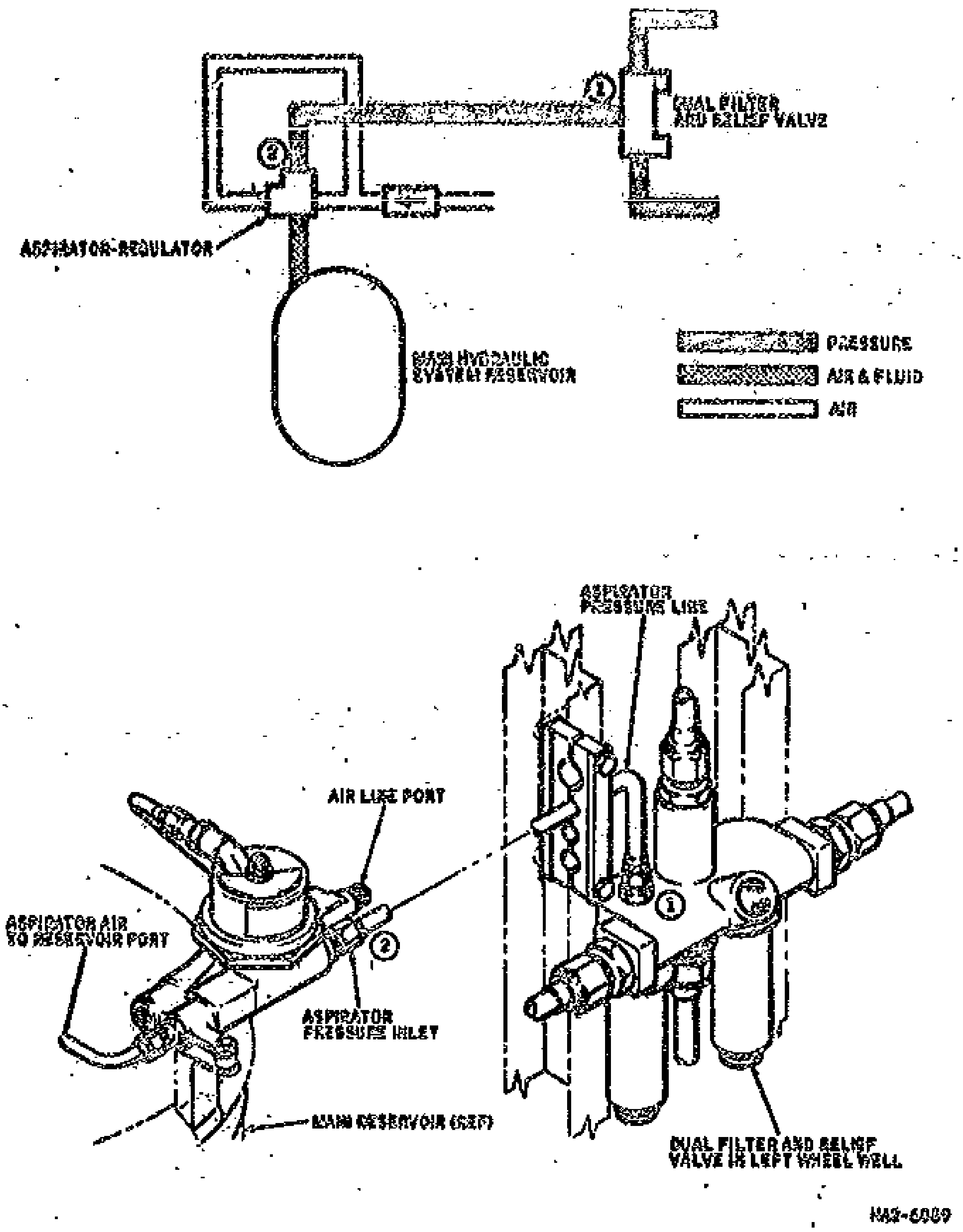
(1) Remove 1/4-inch regulator-aspirator pressure line, located between aspirator and dual filter and relief valve.

(2) Connect test stand pressure hose to one end of line, and connect test stand return hose to other end.

(3) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(4) Flush line for five minutes.

(5) Depressurize test stand and remove hoses.




Flushing Procedure Line Connection Locations
Figure 601

(6) Inspect regulator-aspirator inlet filter for contamination. Replace or clean filter as necessary.

(7) Connect aspirator line to aspirator and to dual filter and relief valve.

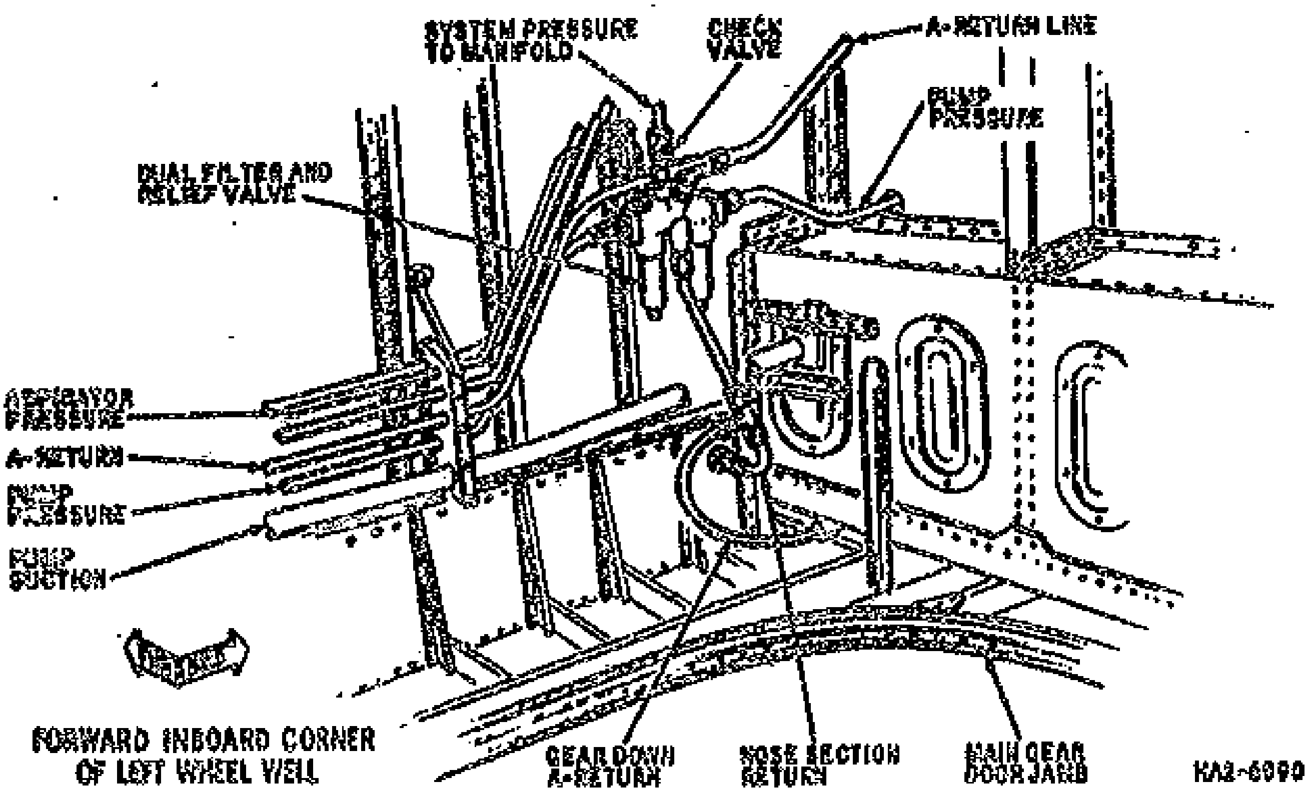
B. Empennage Pressure and Return Lines (See Figures 602 Through 604.)

NOTE: This procedure covers the lines from the dual filter and relief valve (outlet side) to the rudder and horizontal stabilizer filter, located in the pressure line in the empennage, and the B-return and low-pressure return lines from the empennage bulkhead back to the left wheel well.

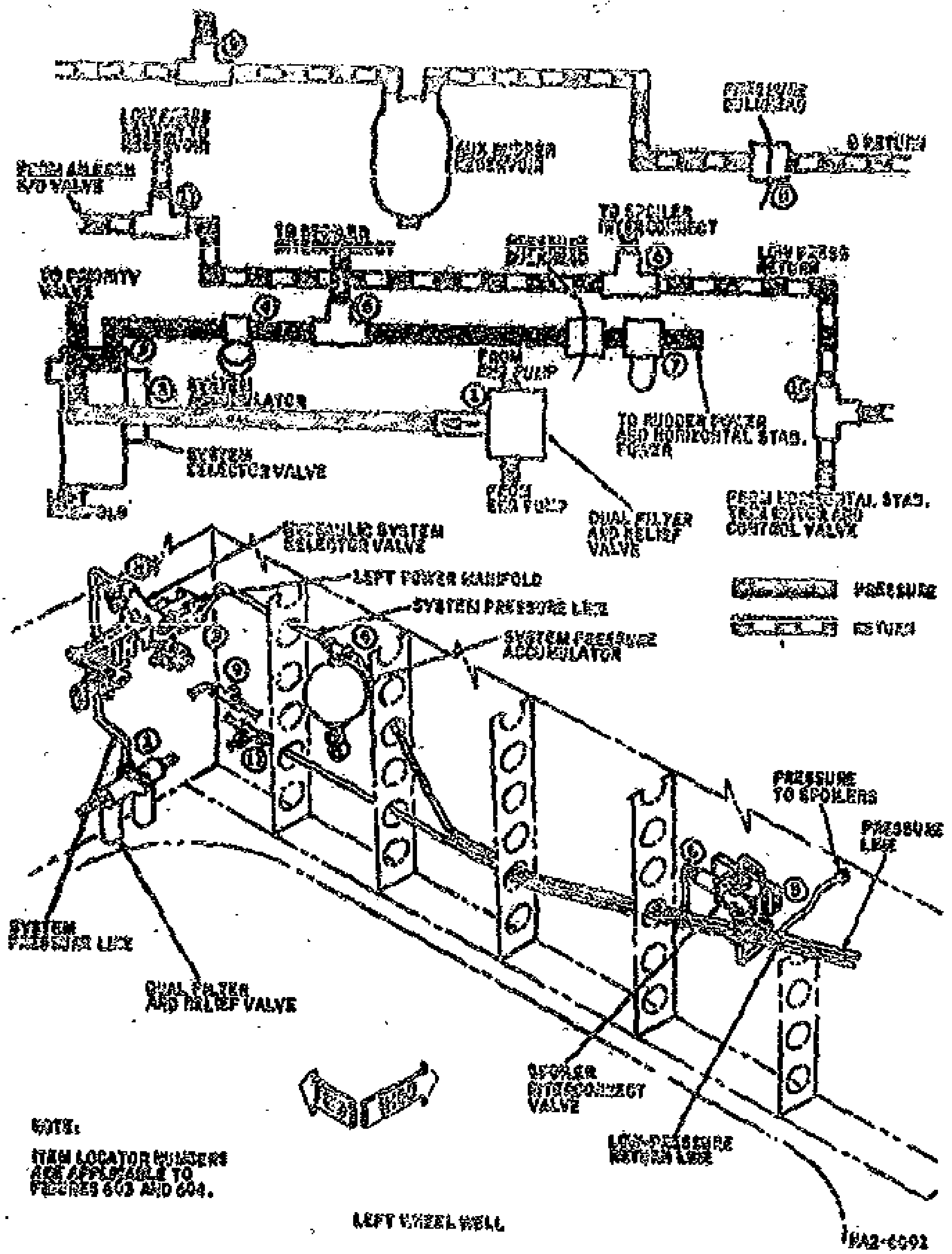
(1) Disconnect pressure line from check valve, located on top side of dual filter and relief valve. Connect this line to test stand pressure hose.

(2) Inspect, clean, and/or replace check valve.

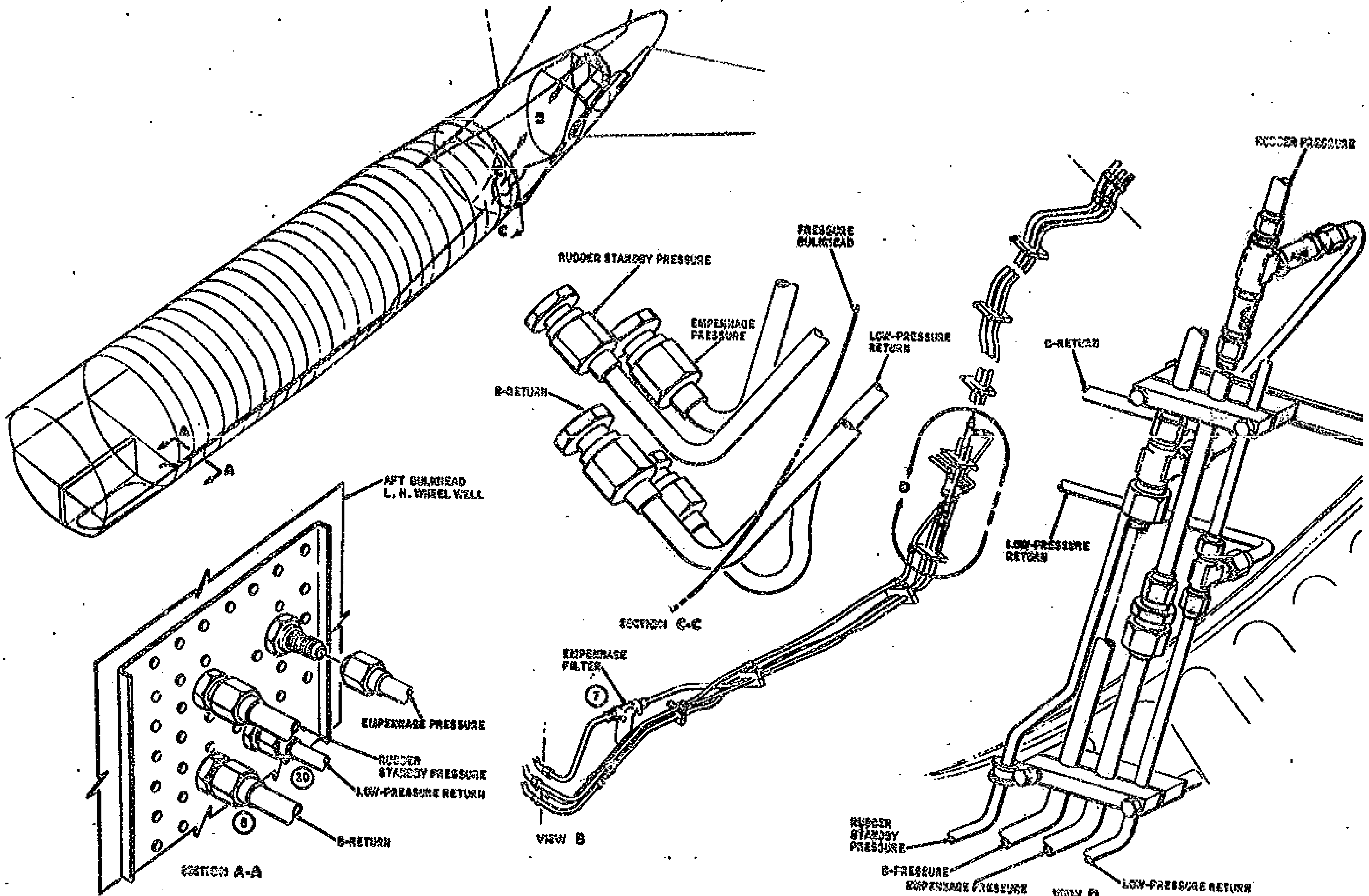
(3) Place system selector valve in general system (normal) position.




Flushing Procedure Line Connection Locations
Figure 602




Flushing Procedure Line Connection Locations
Figure 603




Flushing Procedure Line Connection Locations
Figure 604

(4) Disconnect lines which run from tees in low-pressure return line and empennage pressure line to spoiler interconnect valve. Cap tees. Spoiler interconnect valve is located on inboard side of left wheel well.

(5) In empennage, disconnect pressure line at empennage filter. Install jumper between this line and B-return line at pressure bulkhead.

(6) Disconnect empennage B-return line at tee fitting in B-return line, located below left power manifold. Connect aft line to test stand return hose. Cap tee fitting.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

(10) In empennage, disconnect jumper line from B-return line, and connect to low-pressure return line.

(11) Disconnect 1/4-inch low-pressure line (empennage drain) from tee fitting in low-pressure return line (case drain), located to left of centerline of airplane and aft of rear spar.

(12) Disconnect test stand return hose from B-return hose, and connect it to low-pressure return line located inboard of dual filter and relief valve.

(13) Repeat Steps (8 through 10).

(14) Clean or replace empennage filter element and bowl.

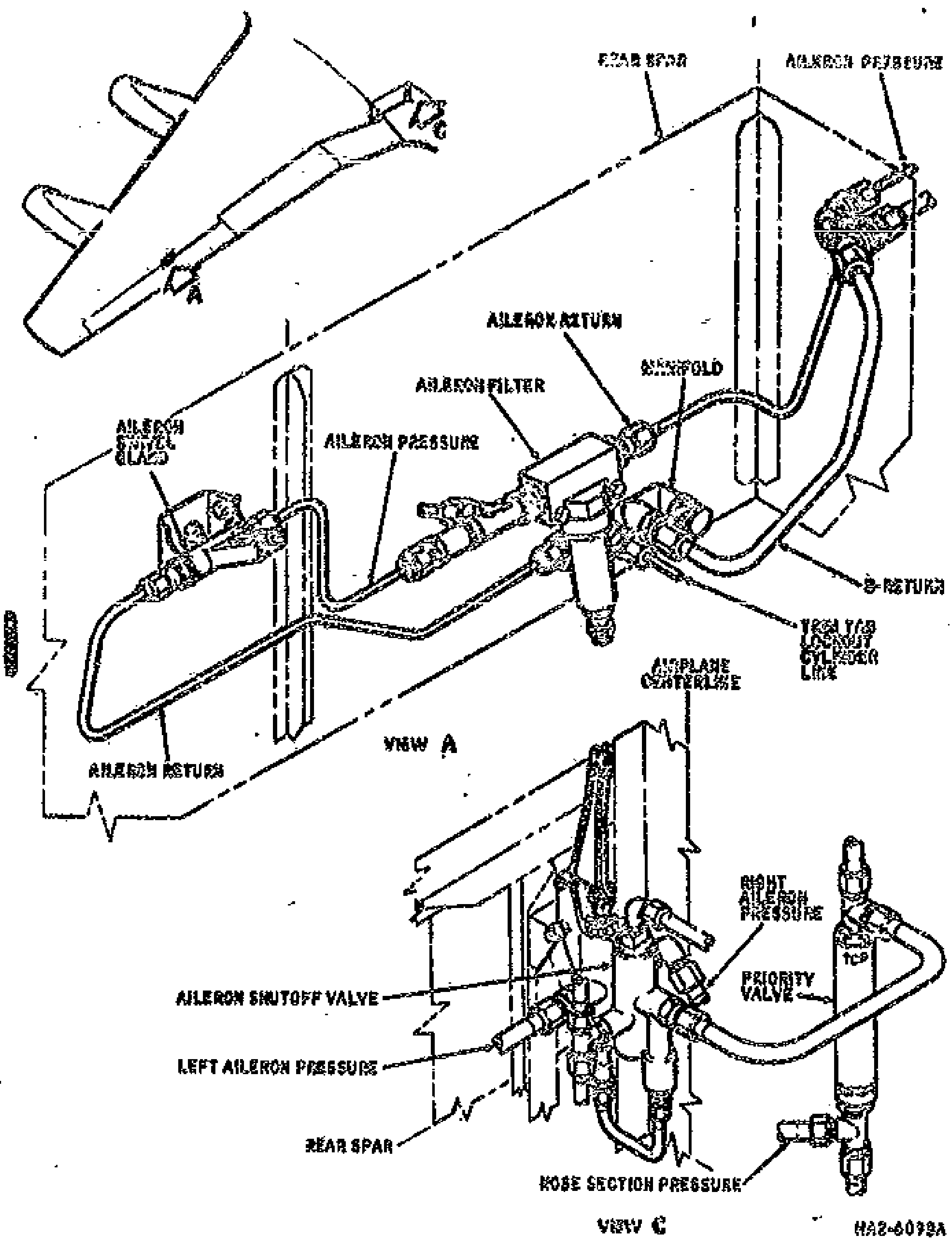
(15) Inspect, clean, and/or replace hydraulic system accumulator.

(16) Restore all lines and units to original configuration.

**NOTE:** For continuation of flushing rudder and horizontal stabilizer systems, refer to 29-05.

C. Aileron Pressure and Return Lines (See Figure 605.)

(1) Disconnect aileron pressure line at inboard port of left aileron filter, and disconnect aileron B-return line from aileron swivel gland. Connect these two lines together with jumper.




Flushing Procedure Line Connection Locations
Figure 605

(2) Disconnect left aileron pressure line at aileron shutoff valve, located in left wheel well. Connect this line to test stand pressure hose.

(3) Disconnect aileron B-return line from cross fitting at B-return port of reservoir. Connect this line to test stand return hose.

(4) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand.

(7) Disconnect pressure line at inboard port of right aileron filter, and disconnect aileron A-return line from aileron swivel gland. Connect these two lines together.

(8) Disconnect right aileron pressure line at aileron shutoff valve, located in left wheel well. Connect line to test stand pressure hose.

(9) Disconnect aileron A-return line from tee at the bottom of right power manifold, located in right wheel well. Connect line to test stand return hose.

(10) Repeat Steps (5 through 7) for these lines.

(11) Remove, inspect, clean, and/or replace priority valve and fittings, located on bottom of the left power manifold.

(12) Restore all lines and units to original configuration.

(13) Clean and/or replace aileron filter elements.

NOTE: For continuation of flushing aileron system components, refer to 29-05.

D. Nose System Pressure and Return Lines (See Figure 606.)

(1) In nosewheel well, disconnect 1/4-inch return line which runs from nose gear control valve to bulkhead tee fitting in A-return line, at tee. Cap tee.

(2) Disconnect pressure line leading into nose gear control valve at valve. In this same line, replace check valve with jumper line.

(3) Disconnect pressure line which runs to tee in pressure accumulator, from pressure bulkhead tee at rear of wheel well.

(4) Connect two open lines from Steps (2 and 3) with jumper.

(5) Disconnect at tee, pressure line which runs from reserve pressure accumulators to tee near centerline of airplane. Cap tee.

(6) Disconnect pressure line leading into reserve accumulator shutoff valve.

(7) Disconnect return line from tee in steering relief valve. Connect this line to pressure line at shutoff valve with jumper line.

(8) On freighter type airplanes, disconnect cargo door pressure line at tee fitting in nose system pressure line. Cap tee and cargo door pressure line.

NOTE: The cargo door pressure line tee fitting is located in the forward left side of the forward baggage compartment.

(9) In left main gear wheel well, disconnect nose system pressure line from side port of tee in priority valve. Connect line to test stand pressure hose.

(10) Disconnect nose system A-return line from bottom of dual filter and relief valve. Connect line to test stand return hose.

(11) Disconnect main gear control valve A-return line from tee in nose gear A-return line. Cap tee.

(12) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(13) Flush circuit for five minutes.

(14) Depressurize test stand.

(15) Remove, inspect, clean, and/or replace miniature check valve, located in nose system return port of dual filter and relief valve.

(16) Repeat Step (15), inspection etc., for following items:

(a) Two check valves jumpered in nosewheel well

(b) Two reserve pressure accumulators and attaching lines

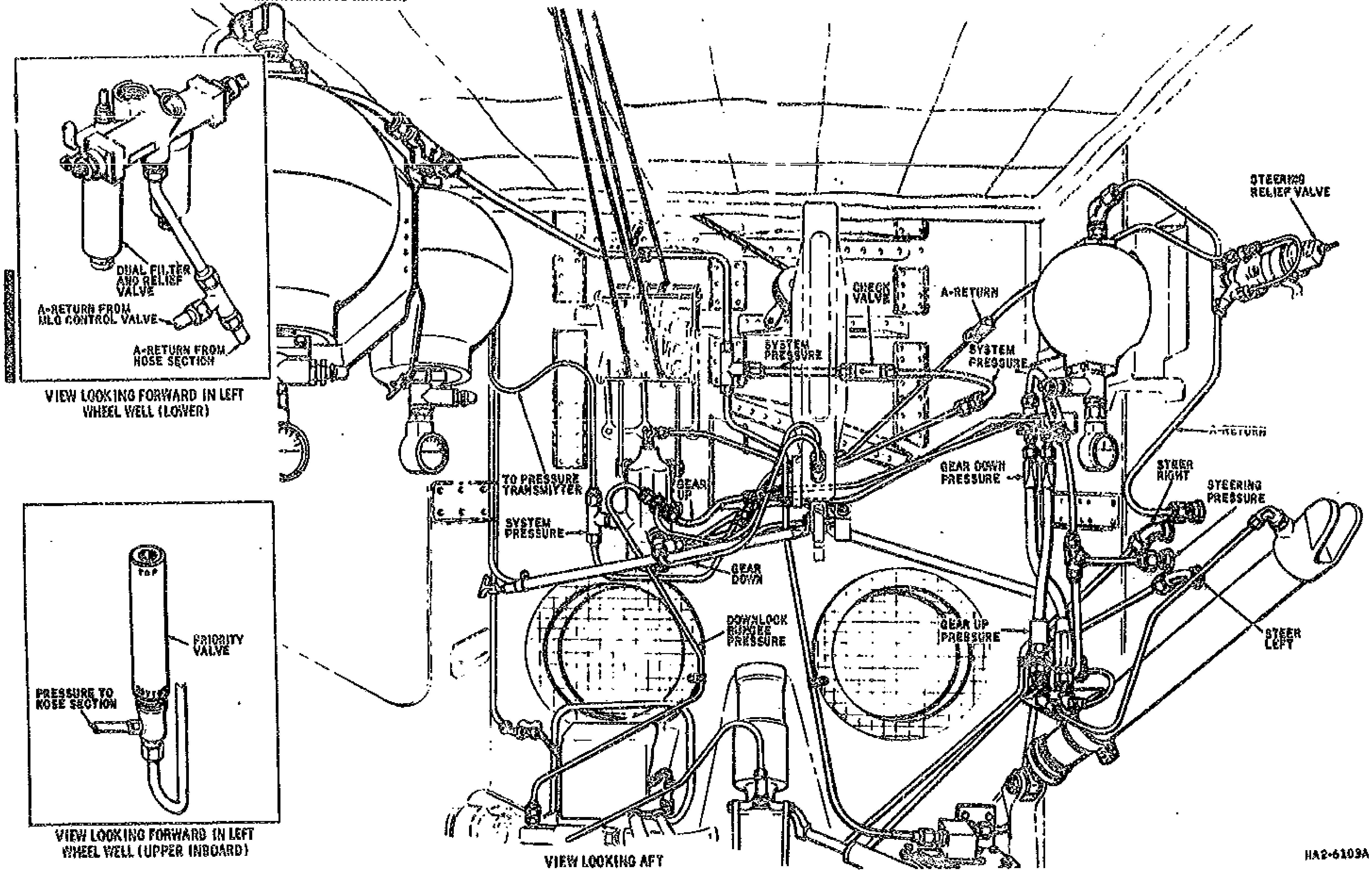
(c) System pressure transmitter and attaching lines.

(17) Restore all lines and units to original configuration.

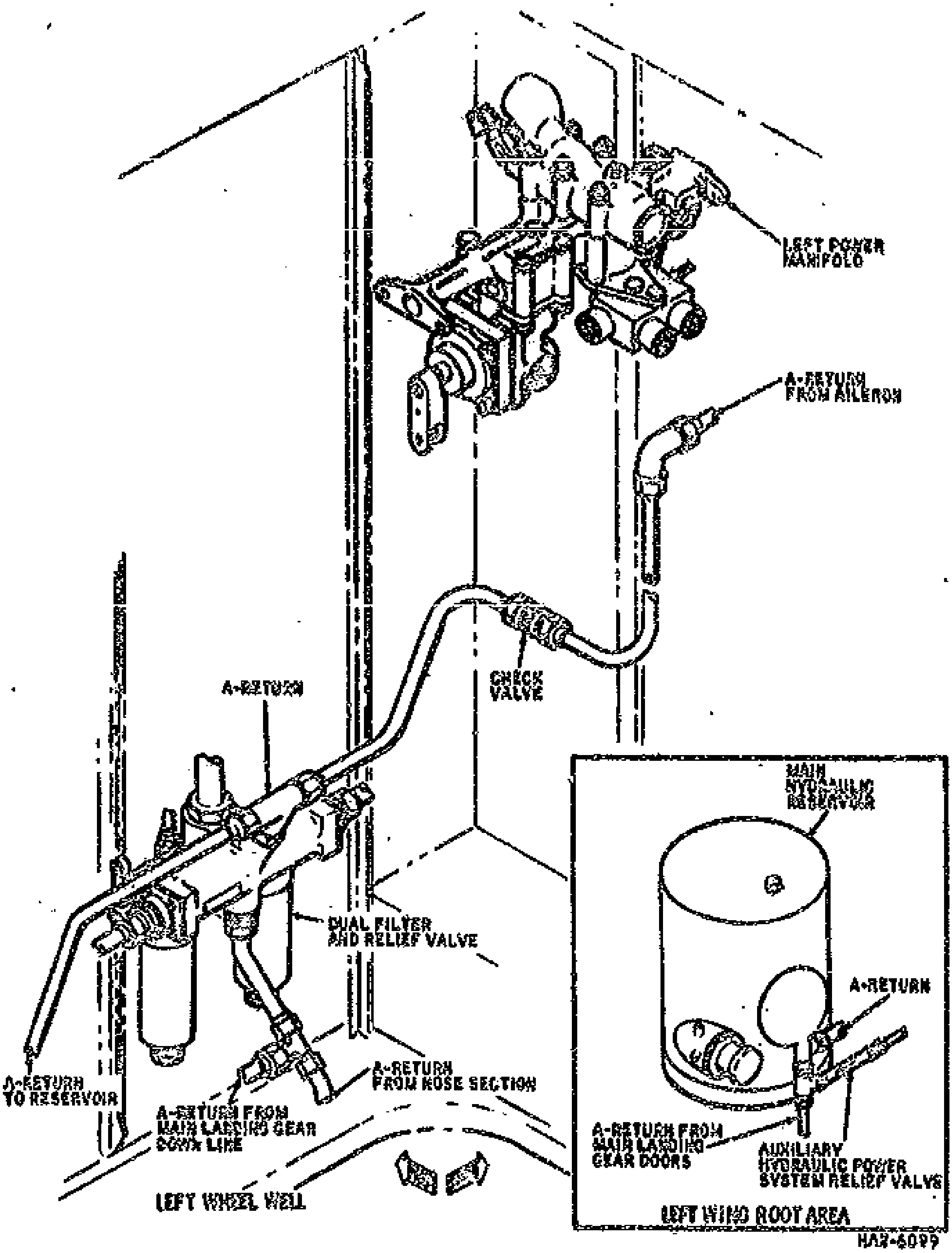
NOTE: For continuation of flushing of nose gear system, refer to 29-04.

B. Flush A-Return Line (See Figure 607.)

(1) Disconnect aileron A-return line from bulkhead elbow in A-return line, located below left power manifold. Cap elbow.




Flushing Procedure Line Connection Locations
Figure 606




Flushing Procedure Line Connection Locations
Figure 607

(2) Connect line to test stand pressure hose.

(3) Place jumper around miniature check valve, located in A-return line under left power manifold.

(4) Disconnect A-return lines from tee in dual filter and relief valve. Install jumper between these lines.

(5) Disconnect A-return line from reservoir fittings. Connect line to test stand return hose.

(6) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Inspect, clean, and/or replace miniature check valve which was removed in Step (3).

(10) Restore all lines and units to original configuration.

F. Flush B-Return Line (See Figure 608.)

(1) Disconnect B-return line from miniature check valve installed in right power manifold. Connect this line to test stand pressure hose.

(2) Disconnect empennage return line from tee in B-return line. Cap tee.

(3) Disconnect left antiskid return line, and left aileron return line from B-return cross fitting located adjacent to main reservoir. Cap two openings.

(4) Disconnect B-return line from check valve in reservoir B port. Connect line to test stand return hose.

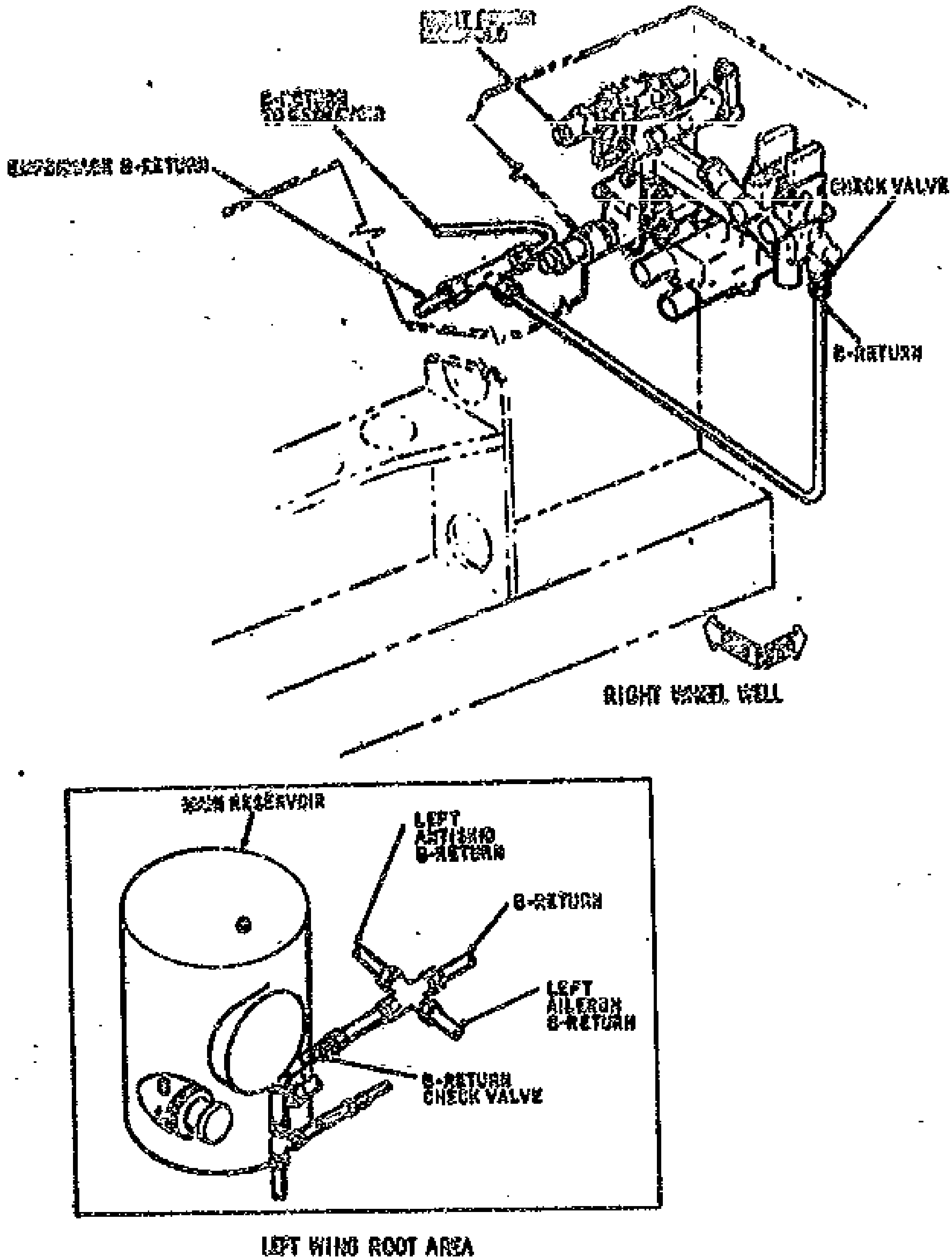
(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for five minutes.

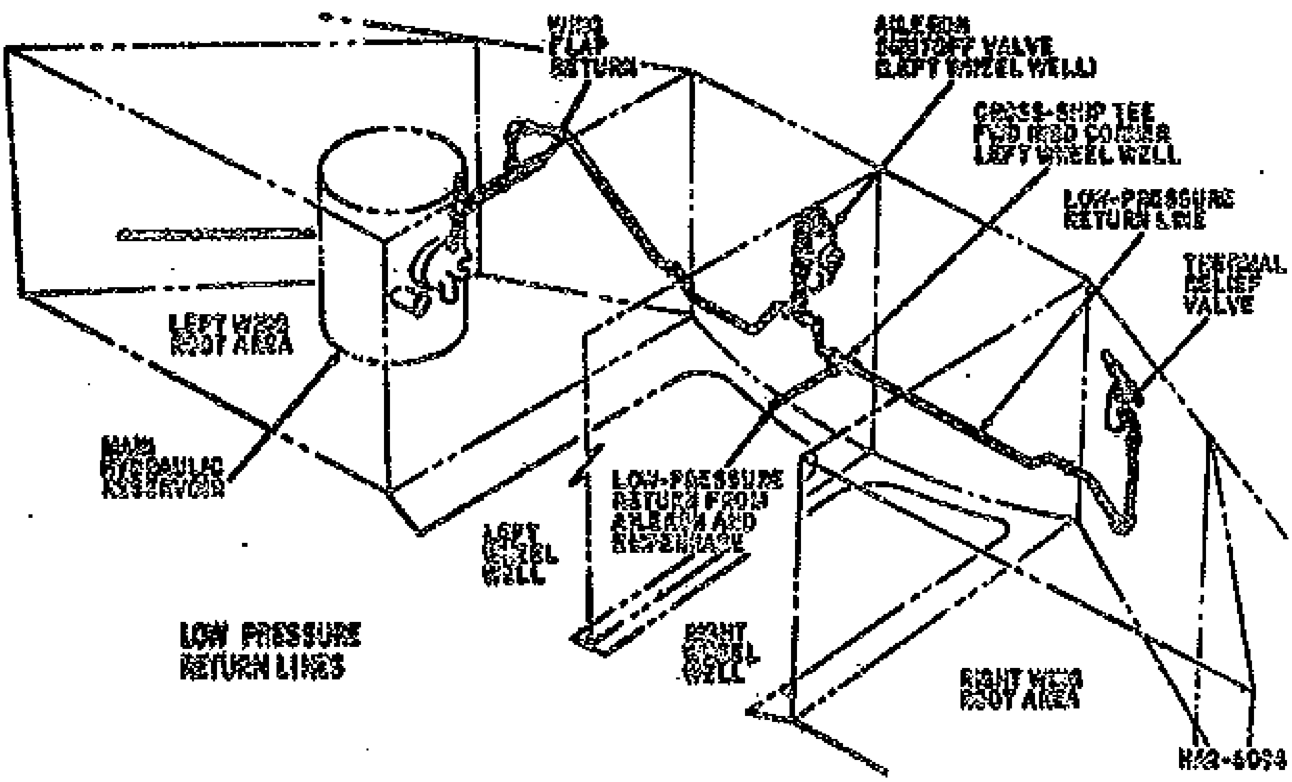
(7) Depressurize test stand.

(8) Remove check valve from reservoir B port, and miniature check valve (Step 1.). Inspect, clean, and/or replace check valves.

(9) Restore all lines and units to original configuration.




Flushing Procedure Line Connection Locations
Figure 603




Flushing Procedure Line Connection Locations
Figure 609

G. Power Manifolds

(1) If contamination downstream of the dual filter and relief valve is general, the right and left power manifolds with attaching valves must be removed, inspected, cleaned, and/or replaced.

H. Flush Low-Pressure Return Lines (See Figure 609.)

(1) In right wing root area, disconnect low-pressure return line from wing flap thermal relief valve. Connect this line to test stand pressure hose. Thermal relief valve is located on the rear spar.

(2) In left wheel well, below dual filter and relief valve, disconnect low-pressure return line from top of tee which connects aileron valve drain and empennage drain returns to cross-ship low-pressure return. Cap tee.

(3) Disconnect low-pressure return line from tee fitting that joins wing flap return at main reservoir. Cap tee, and connect line to test stand return hose.

(4) Pressurize test stand to 200 psi at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand.

(7) Remove line from tee in aileron shutoff valve to tee fitting in low-pressure return line, in left wheel well. Flush line.

(8) Remove, clean and/or replace aileron shutoff valve and thermal relief valve.

(9) Restore all lines and units to original configuration.

MAIN HYDRAULIC POWER SYSTEM (BEYOND DUAL FILTER AND RELIEF VALVE) -

INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the main hydraulic power system by flushing the systems with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Main Hydraulic Power System (Beyond Dual Filter and Relief Valve)

   A. Regulator-Aspirator Pressure Line (See Figure 601.)

      (1) Remove 1/4-inch regulator-aspirator pressure line, located between aspirator and dual filter and relief valve.

      (2) Connect test stand pressure hose to one end of line, and connect test stand return hose to other end.

      (3) Pressurize test stand to 200 psi maximum at 20 gpm flow.

      (4) Flush line for five minutes.

      (5) Depressurize test stand and remove hoses.

      (6) Inspect regulator-aspirator inlet filter for contamination. Replace or clean filter as necessary.

(7) Connect aspirator line to aspirator and to dual filter and relief valve.

B. Empennage Pressure and Return Lines (See Figures 602 Through 604.)

NOTE: This procedure covers the lines from the dual filter and relief valve (outlet side) to the rudder and horizontal stabilizer filter, located in the pressure line in the empennage, and the B-return and low-pressure return lines from the empennage bulkhead back to the left wheel well.

(1) Disconnect pressure line from check valve, located on top side of dual filter and relief valve. Connect this line to test stand pressure hose.

(2) Inspect, clean, and/or replace check valve.

(3) Place system selector valve in general system (normal) position.

(4) Disconnect lines which run from tees in low-pressure return line and empennage pressure line to spoiler interconnect valve. Cap tees. Spoiler interconnect valve is located on inboard side of left wheel well.

(5) In empennage, disconnect pressure line at empennage filter. Install jumper between this line and B-return line at pressure bulkhead.

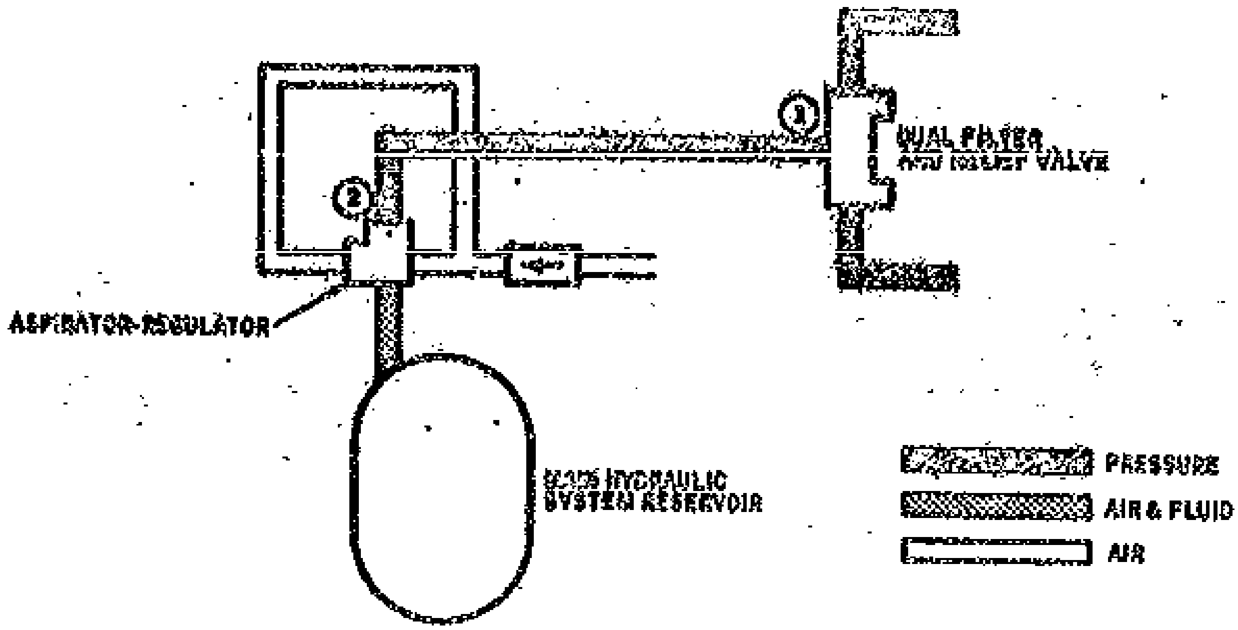
(6) Disconnect empennage B-return line at tee fitting in B-return line, located below left power manifold. Connect aft line to test stand return hose. Cap tee fitting.

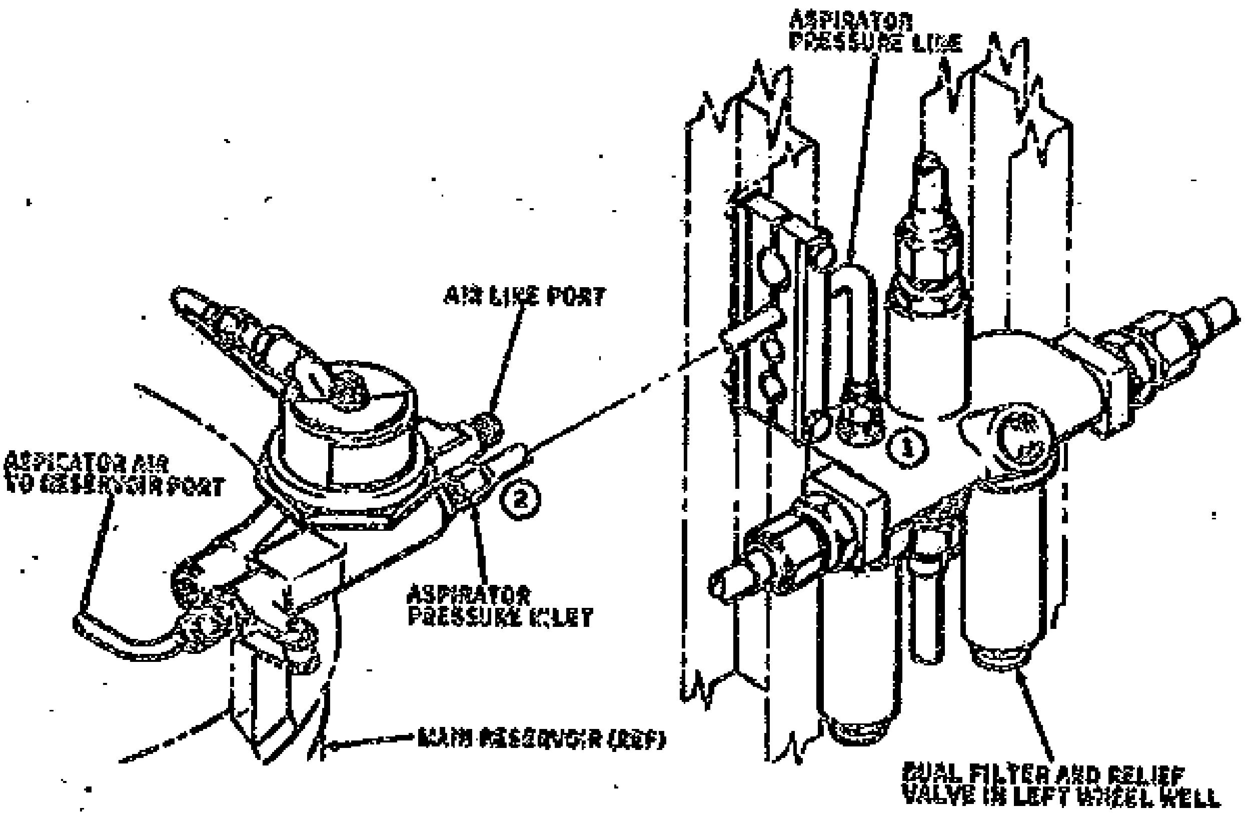
(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

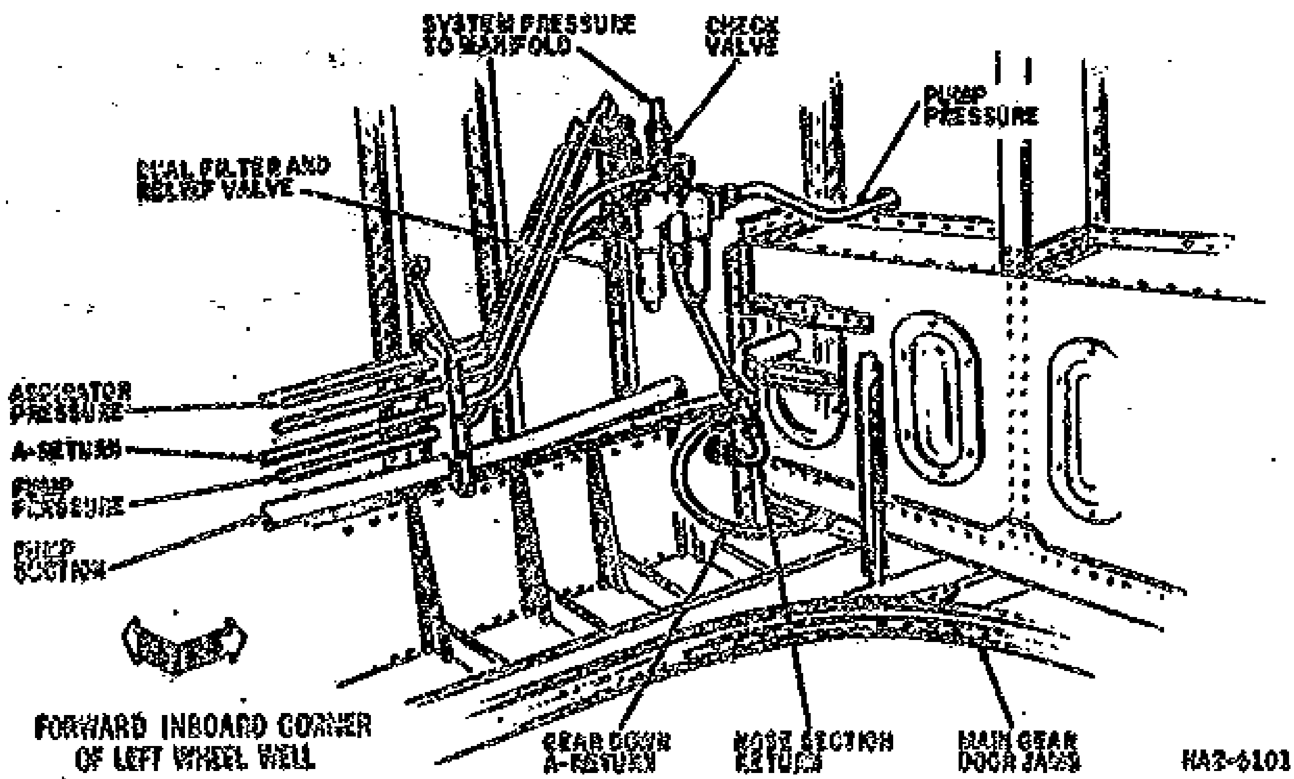
(9) Depressurize test stand.

(10) In empennage, disconnect jumper line from B-return line, and connect to low-pressure return line.

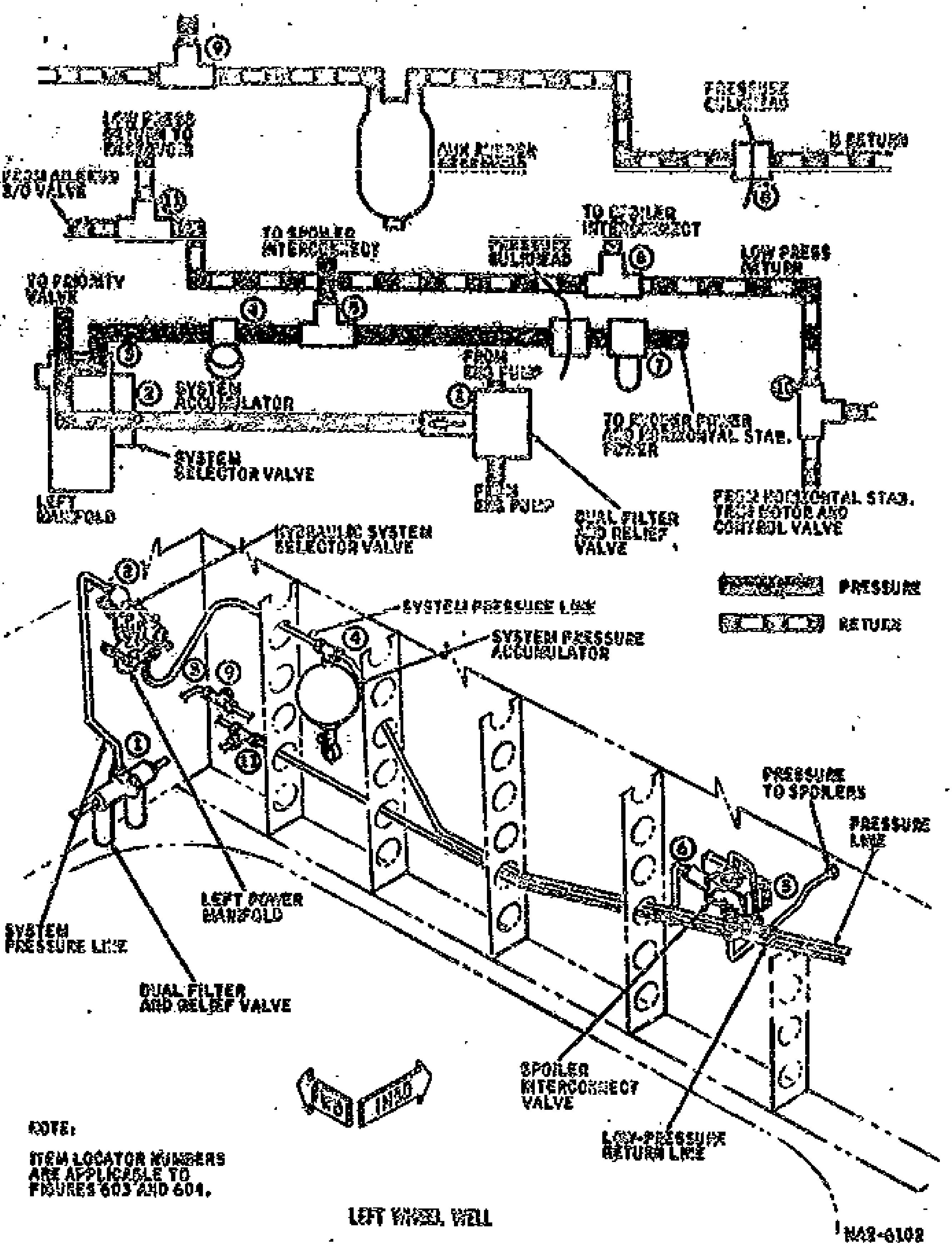



Flushing Procedure Line Connection Locations
Figure 601




Flushing Procedure Line Connection Locations
Figure 602



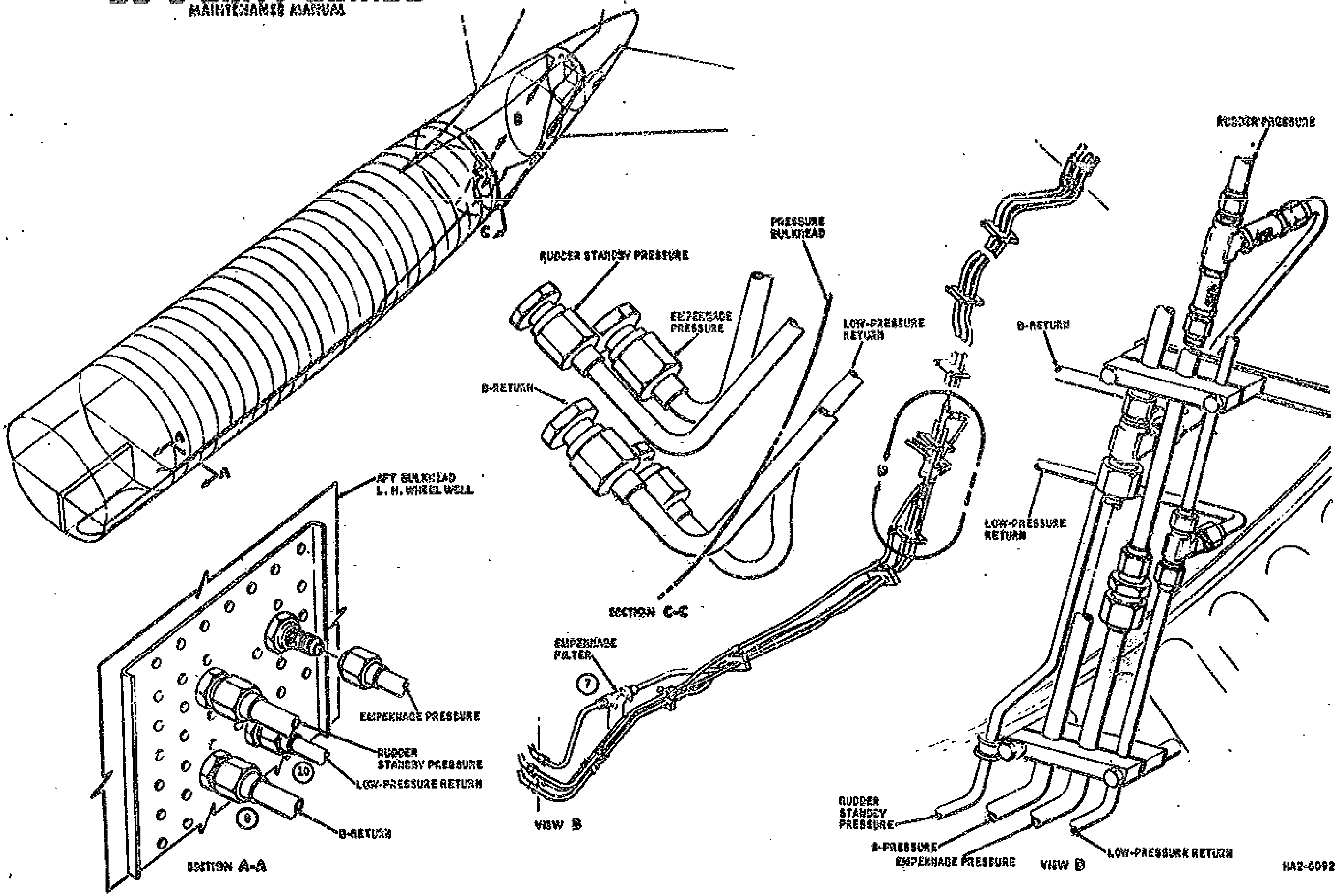
NOTE:

ITEM LOCATOR NUMBERS ARE APPLICABLE TO FIGURES 603 AND 604.

LEFT WHEEL WELL

Flushing Procedure Line Connection Locations
Figure 603

THIS PAGE INTENTIONALLY LEFT BLANK




Flushing Procedure Line Connection Locations
Figure 604

(11) Disconnect 1/4-inch low-pressure line (expansage drain) from tee fitting in low-pressure return line (case drain), located to left of centerline of airplane and aft of rear spar.

(12) Disconnect test stand return hose from B-return hose, and connect it to low-pressure return line located inboard of dual filter and relief valve.

(13) Repeat Steps (8 through 10).

(14) Clean or replace expansage filter element and bowl.

(15) Inspect, clean, and/or replace hydraulic system accumulator.

(16) Restore all lines and units to original configuration.

NOTE: For continuation of flushing rudder and horizontal stabilizer systems, refer to 29-05.

C. Aileron Pressure and Return Lines (See Figures 605 and 607.)

(1) Disconnect aileron pressure line at inboard port of left aileron filter, and disconnect aileron return line from aileron swivel gland. Connect these two lines together with jumper.

(2) Disconnect lines from both ends of check valve in outlet line of thrust reverser reservoir. Connect jumper line between these lines (see Figure 607).

(3) Disconnect left aileron pressure line at aileron shutoff valve located in left wheel well (see Figure 605). Connect this line to test stand pressure hose.

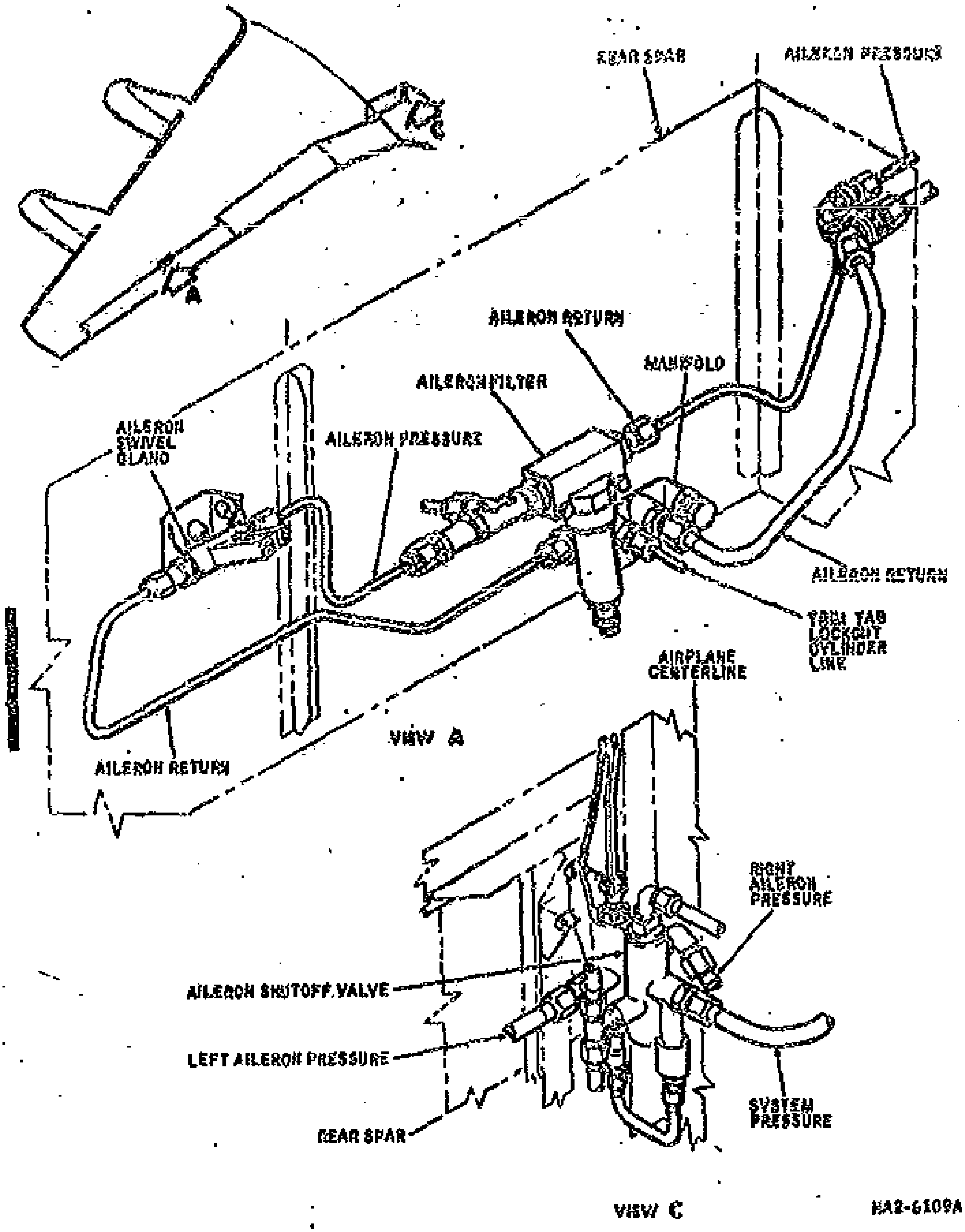
(4) Disconnect A-return line at reservoir. Connect this line to test stand return hose.

(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for five minutes.

(7) Depressurize test stand.

(8) Disconnect pressure line at inboard port of right aileron filter, and disconnect aileron return line from aileron swivel gland. Connect these two lines togehter.




Flushing Procedure Line Connection Locations
Figure 605

(9) Disconnect right aileron pressure line at aileron shutoff valve, located in left wheel well. Connect line to test stand pressure hose.

(10) Disconnect right aileron return line from tee forward of flap reservoir (see Figure 607). Connect line to test stand return hose.

(11) Repeat Steps (6 through 8) for these lines.

(12) Restore all lines and units to original configuration.

(13) Remove magnetic drain plug from thrust reverser reservoir and drain reservoir. Clean plug, reinstall and safety with lock wire (see Chapter 78).

(14) Clean and/or replace aileron filter elements.

(15) Clean or replace check valve jumpered in step (2).

NOTE: For continuation of flushing aileron system components, refer to 29-05.

D. Nose System Pressure and Return Lines (See Figure 606.)

(1) In nosewheel well, disconnect 1/4-inch return line which runs from nose gear control valve to bulkhead tee fitting in A-return line, at tee. Cap tee.

(2) Disconnect pressure line leading into nose gear control valve at valve. In this same line, replace check valve with jumper line.

(3) Disconnect pressure line which runs to tee in pressure accumulator, from pressure bulkhead tee at rear of wheel well. Cap tee.

(4) Connect two open lines from Step (2) and Step (3) with jumper.

(5) Disconnect at tee, pressure line which runs from reserve pressure accumulators to tee near centerline of airplane. Cap tee.

(6) Disconnect pressure line leading into reserve accumulator shutoff valve.

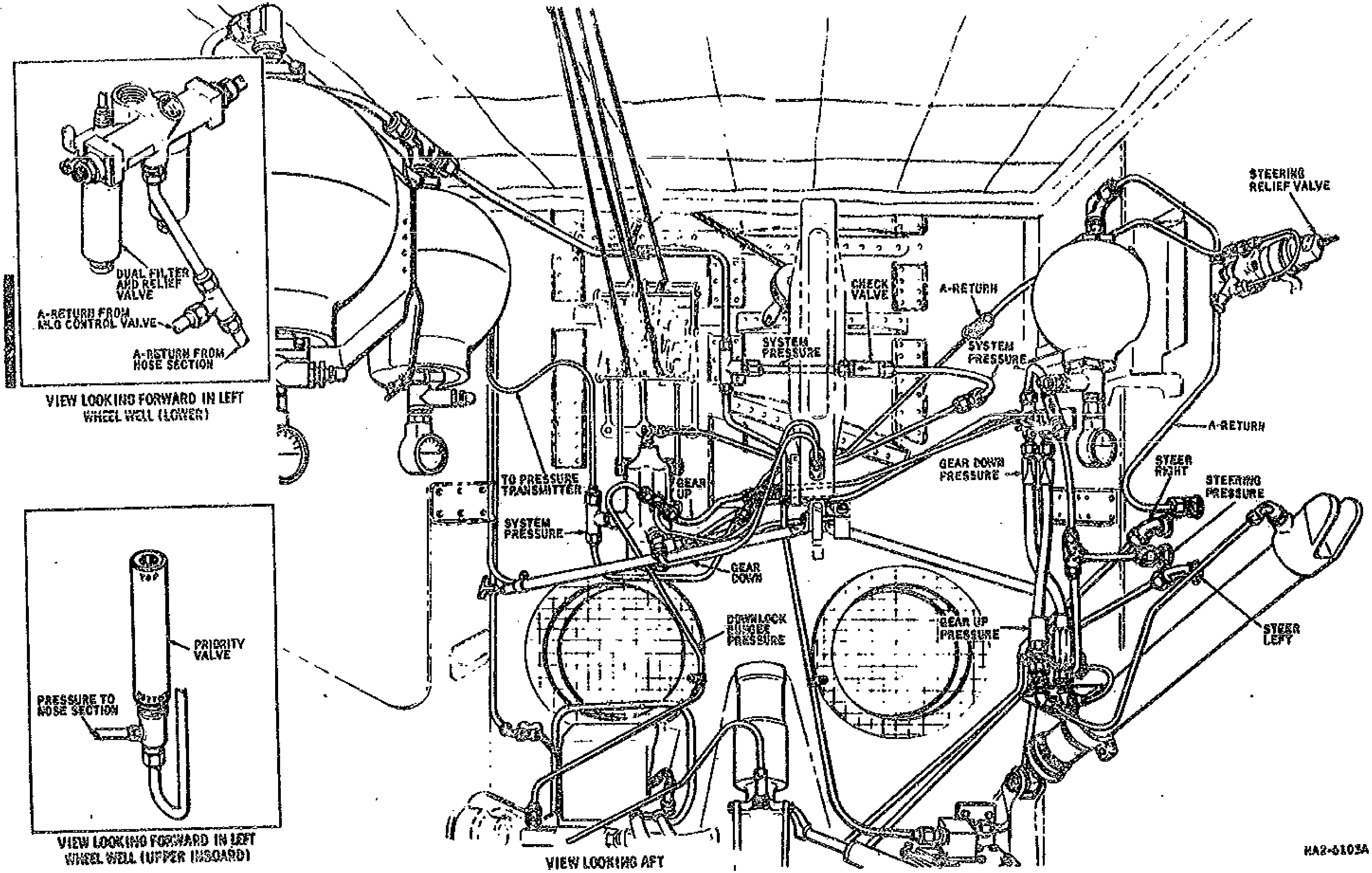
(7) Disconnect return line from tee in steering relief valve. Connect this line to pressure line at shutoff valve with jumper line.

(8) On freighter type airplanes, disconnect cargo door pressure line at tee fitting in nose system pressure line. Cap tee and cargo door pressure line.

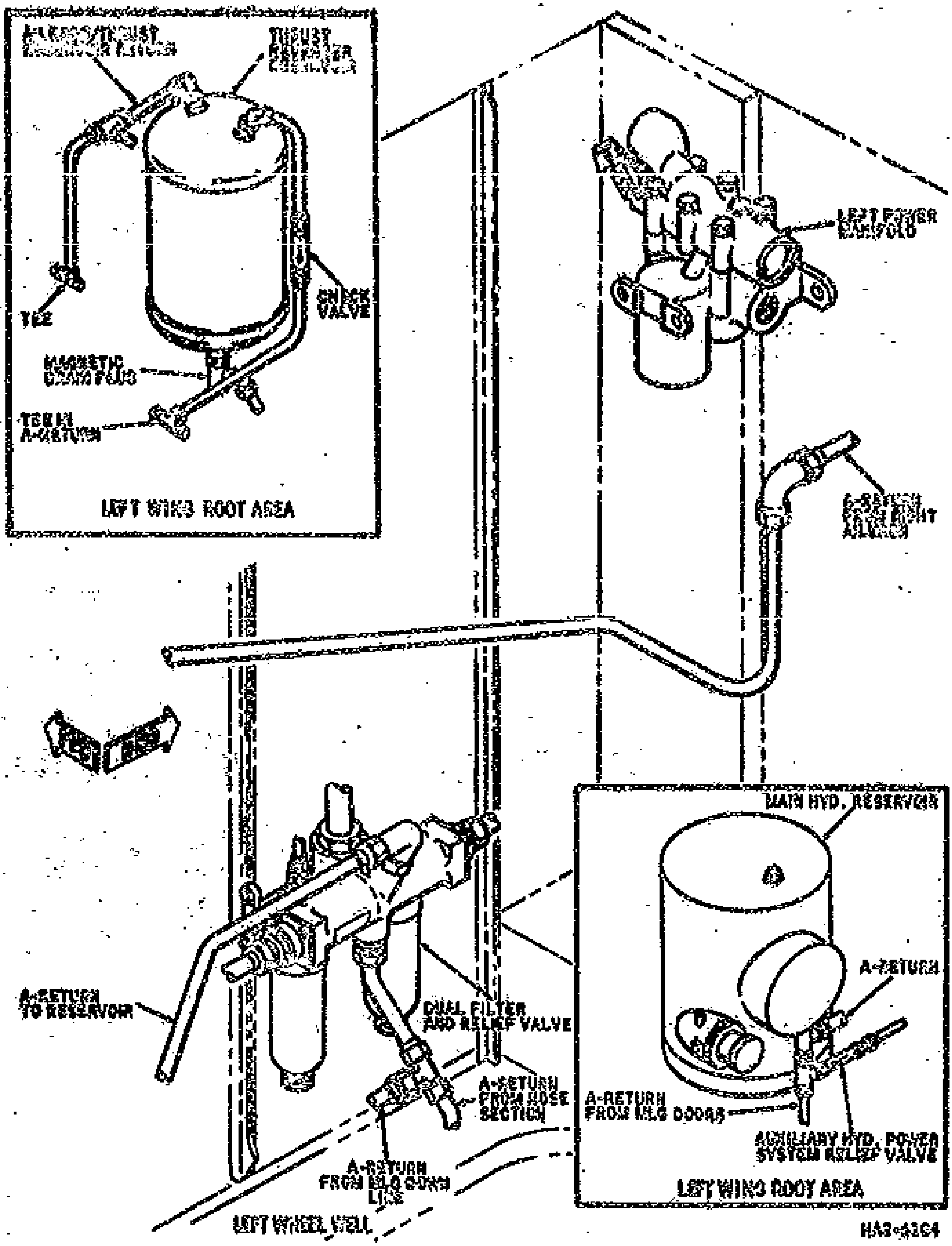
NOTE: The cargo door pressure line tee fitting is located in the forward left side of the forward baggage compartment.

(9) In left main gear wheel well, disconnect nose system pressure line from side port of tee in priority valve. Connect line to test stand pressure hose.

THIS PAGE INTENTIONALLY LEFT BLANK




Flushing Procedure Line Connection Locations
Figure 606




Flushing Procedure Line Connection Locations
Figure 607

(10) Disconnect nose system A-return line from bottom of dual filter and relief valve. Connect line to test stand return hose.

(11) Disconnect main gear control valve A-return line from tee in nose gear A-return line. Cap tee.

(12) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(13) Flush circuit for five minutes.

(14) Depressurize test stand.

(15) Remove, inspect, clean, and/or replace miniature check valve, located in nose system return port of dual filter and relief valve.

(16) Repeat Step (15), inspection etc., for following items:

(a) Check valve jumpered in nosewheel well.

(b) Two reserve pressure accumulators and attaching lines.

(c) System pressure transmitter and attaching lines.

(17) Restore all lines and units to original configuration.

NOTE: For continuation of flushing of nose gear system, refer to 29-04.

E. Flush A-Return Line (See Figure 607.)

(1) Disconnect aileron A-return line from bulkhead elbow in A-return line, located below left power manifold. Cap elbow.

(2) Connect line to test stand pressure hose.

(3) Disconnect lines from both ends of check valve in outlet line of thrust reverser reservoir. Connect jumper between lines.

(4) Disconnect A-return line from reservoir fittings. Connect line to test stand return hose.

(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for five minutes.

(7) Depressurize test stand.

(8) Restore all lines and units to original configuration except return hose to reservoir.

(9) Remove magnetic drain plug from thrust reverser reservoir and drain reservoir. Clean plug, reinstall and safety with lockwire (see Chapter 78).

(10) Disconnect line from elbow at top of dual filter and relief valve. Connect line to pressure stand pressure hose.

(11) Repeat Steps (5 through 7).

(12) Restore all lines and units to original configuration.

F. Flush B-Return Line (See Figure 608.)

(1) Disconnect B-return line from miniature check valve installed in right power manifold. Connect this line to test stand pressure hose.

(2) Disconnect empennage return line from tee in B-return line. Cap tee.

(3) Disconnect brake return line from tee fitting located adjacent to main reservoir. Cap tee.

(4) Disconnect B-return line from check valve in reservoir B-return port. Connect line to test stand return hose.

(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for five minutes.

(7) Depressurize test stand.

(8) Remove check valve from reservoir B-return port and miniature check valve (Step 1). Inspect, clean, and/or replace check valves.

(9) Restore all lines and units to original configuration.

G. Power Manifolds

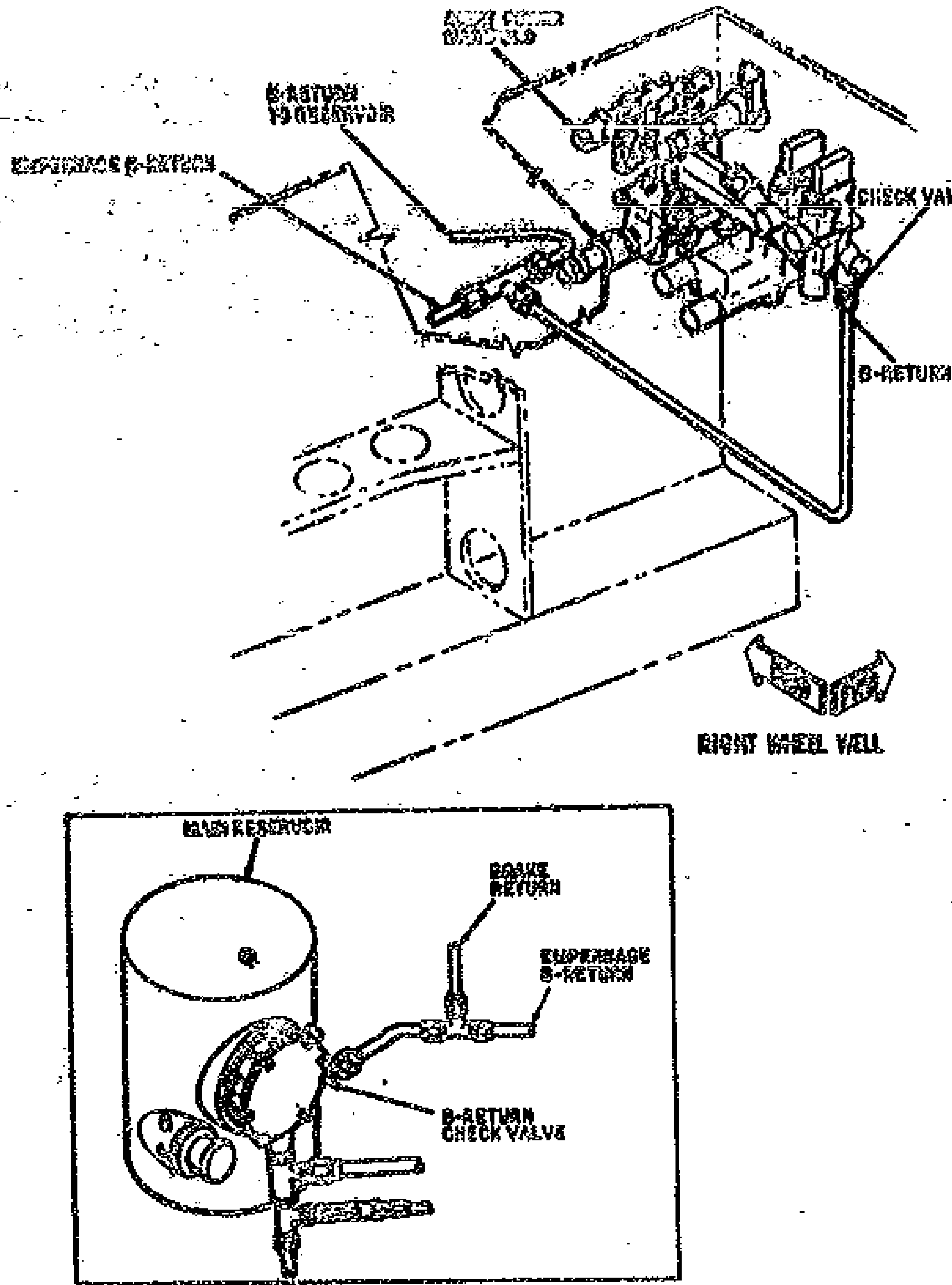
(1) If contamination downstream of the dual filter and relief valve is general, the right and left power manifolds with attaching valves must be removed, inspected, cleaned, and/or replaced.

H. Flush Low-Pressure Return Lines (See Figure 609.)

(1) In right wing root area, disconnect low-pressure return line from wing flap thermal relief valve. Connect this line to test stand pressure hose. Thermal relief valve is located on the rear spar.

(2) In left wheel well, below dual filter and relief valve, disconnect low-pressure return line from top of tee which connects aileron valve drain and empennage drain returns to cross-ship low-pressure return. Cap tee.

(3) Disconnect low-pressure return line from tee fitting that joins wing flap return at main reservoir. Cap tee, and connect line to test stand return hose.




LEFT WING ROOT AREA

6A2-6108

Flushing Procedure Line Connection Locations
Figure 603

(4) Pressurize test stand to 200 psi at 20 gpm flow.

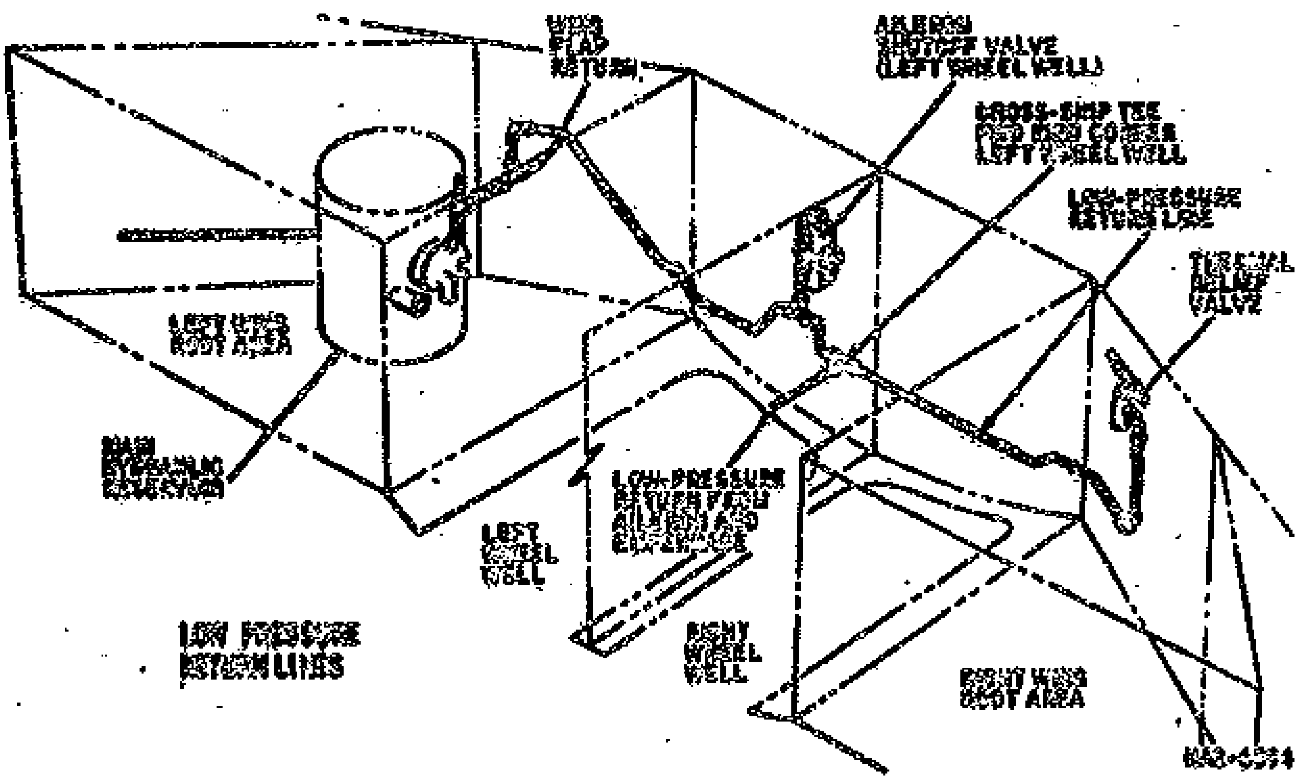
(5) Flush circuit for five minutes.

(6) Depressurize test stand.

(7) Remove line from tee in aileron shutoff valve to tee fitting in low-pressure return line, in left wheel well. Flush line.

(8) Remove, clean and/or replace aileron shutoff valve and thermal relief valve.

(9) Restore all lines and units to original configuration.




Flushing Procedure Line Connection Locations
Figure 609

## AUXILIARY HYDRAULIC POWER SYSTEM - INSPECTION/CHECK

### 1. General

A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the auxiliery hydraulic power system by flushing the system with clean hydraulic fluid.

B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

### 2. Tools and Equipment Required

A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

### 3. Flush Auxiliery Hydraulic Power System

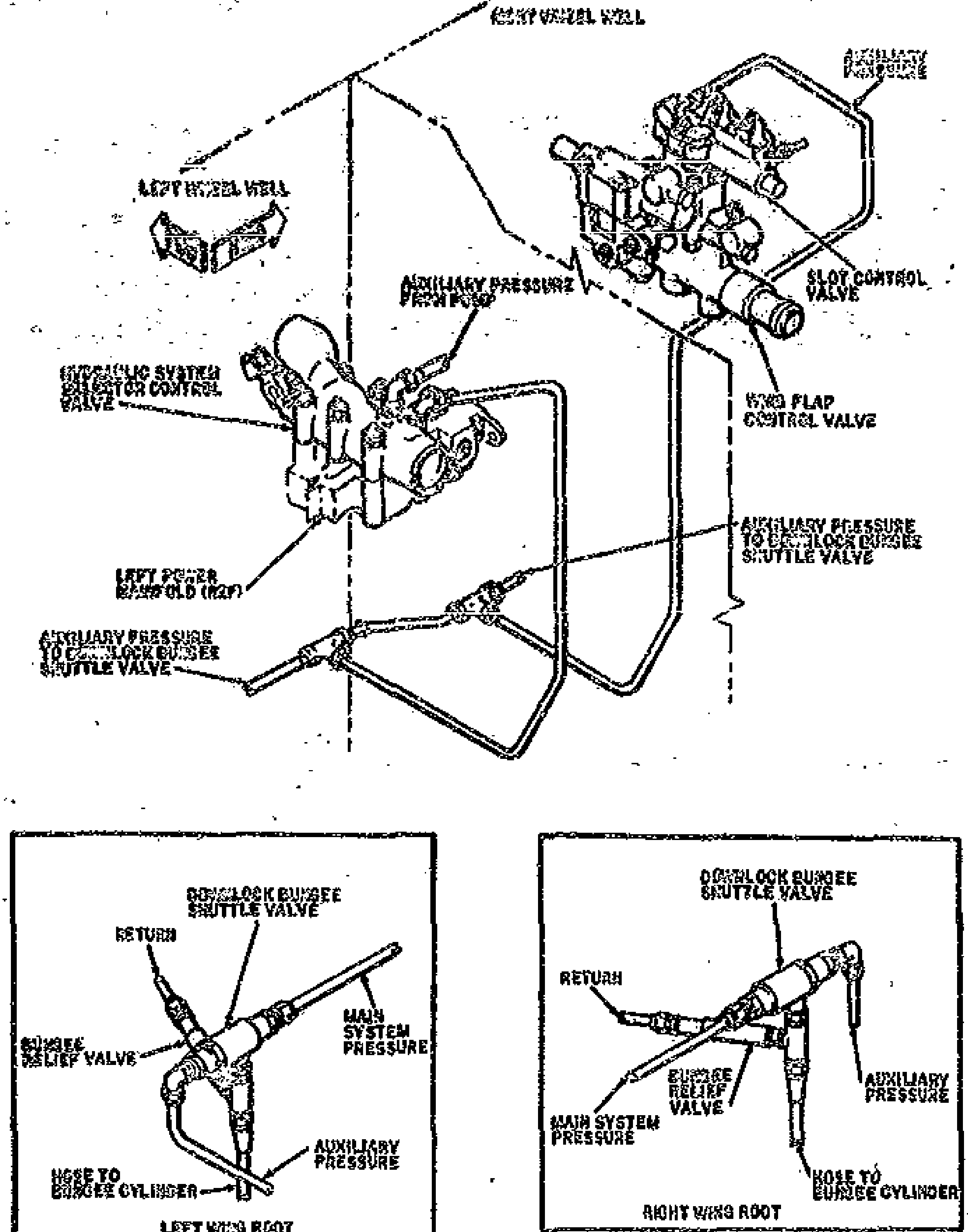
A. Auxiliery Pressure Lines to Wing Flap System

(1) Disconnect pressure line from downstream side (forward) of the auxiliery hydraulic pump filter. Connect this line to test stand pressure hose.

(2) Clean auxiliery pump filter (see 29-20-5).

(3) Remove check valve from auxiliary pressure line, and install a jumper line in its place. Check valve is located above filter.

(4) Disconnect auxiliery pressure lines from inlet and outlet ports of system selector valve, and install jumper line between these lines. Cap valve ports.




HA2-6106

Flushing Procedure Line Connection Locations
Figure 601

(5) Disconnect left main gear downlock bungee cylinder auxiliary pressure lines from tee fitting, located to left of airplane centerline. Cap tee.

(6) Disconnect right main gear downlock bungee cylinder auxiliary pressure line from tee fitting, located to right of airplane centerline. Cap tee.

(7) Disconnect auxiliary pressure line from auxiliary wing flap inlet port, adjacent to slot control valve, on right power manifold. Connect this line to test stand return hose.

(8) Pressurize test stand to 200 psi maximum at 3 to 10 gpm flow.

(9) Flush this circuit for 5 minutes.

(10) Depressurize test stand.

(11) Remove jumper lines, clean, and/or replace check valve removed in Step (3).

(12) Connect all lines except right and left main gear bungee cylinder lines.

B. Auxiliary Pressure Lines to Main Gear Downlock Bungee Cylinders

(1) Connect left main gear downlock bungee cylinder auxiliary pressure line, which was disconnected in paragraph A, Step (5) to test stand pressure hose.

(2) Disconnect left bungee cylinder auxiliary pressure line from shuttle valve, located in left wing root. Connect this line to test stand return hose.

(3) Pressurize test stand to 200 psi maximum at 3 to 10 gpm flow.

(4) Flush this circuit for 5 minutes.

(5) Depressurize test stand.

(6) Repeat steps (1 through 5) for right bungee line.

(7) Inspect, clean, and/or replace shuttle valve, bungee relief valve, and bungee cylinder.

(8) Restore all lines and units to their original configuration.

# AUXILIARY HYDRAULIC POWER SYSTEM - INSPECTION/CHECK

## 1. General

A. The purpose of this section is to provide a logical guide for removing the contaminated (foreign particles) from the fluid, units, and lines of the auxiliary hydraulic power system by flushing the system with clean hydraulic fluid.

B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

## 2. Tools and Equipment Required

A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

## 3. Flush Auxiliary Hydraulic Power System

A. Auxiliary Pressure Lines to Wing Flap System

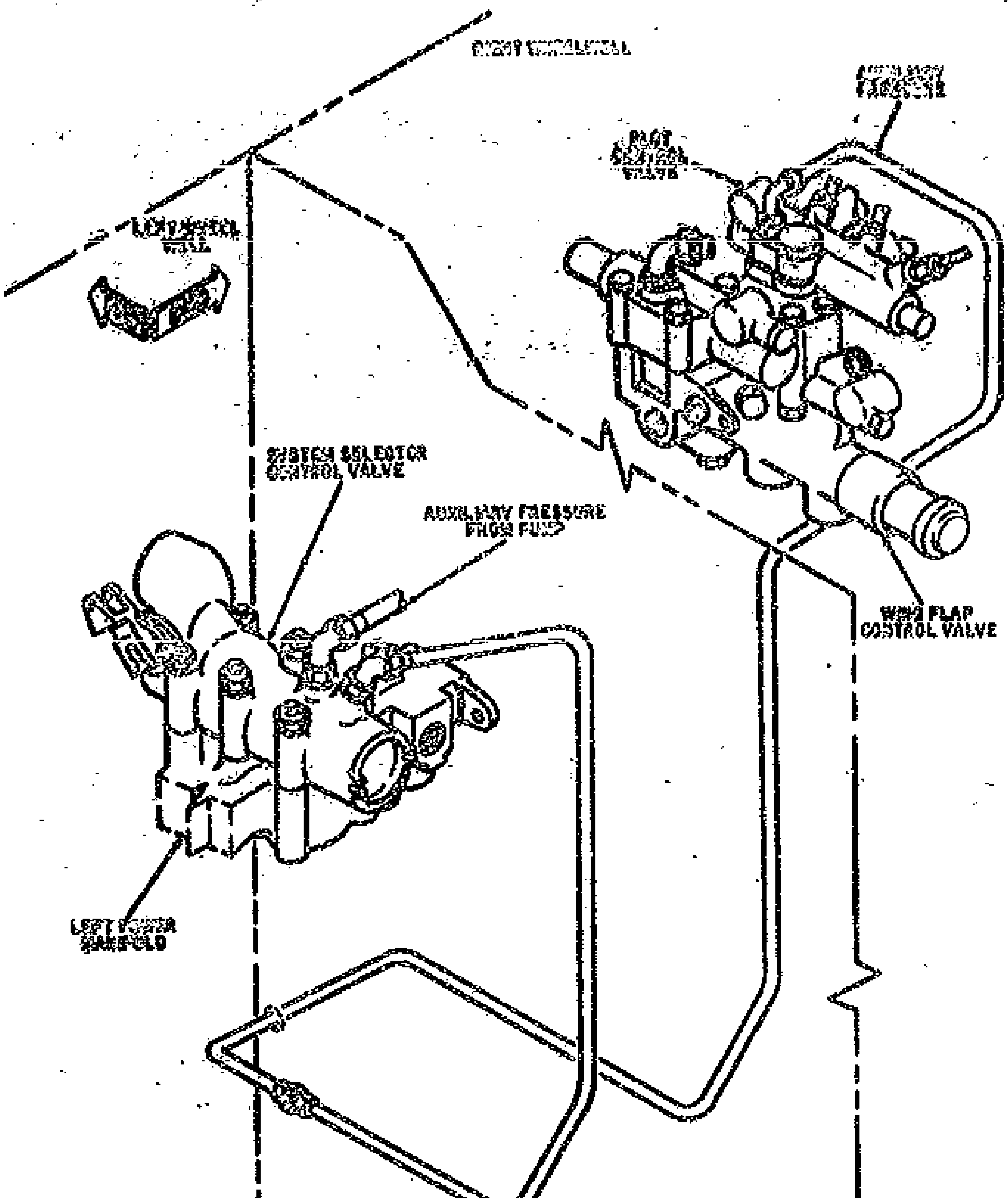
(1) Disconnect pressure line from downstream side (forward) of auxiliary hydraulic pump filter. Connect this line to test stand pressure hose.

(2) Clean auxiliary pump filter (see 29-20-5).

(3) Remove check valve located above above filter from auxiliary pressure line, and install jumper line in its place.

(4) Disconnect auxiliary pressure lines from inlet and outlet ports of system selector control valve, and install jumper between these lines. Cap valve ports.

(5) Disconnect auxiliary pressure line from auxiliary wing flap inlet port in right power manifold. Connect line to test stand return hose.




MA2-6107

Flushing Procedure Line Connection Locations
Figure 601

(6) Pressurize test stand to 200 psi maximum at 3 to 10 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Remove jumper lines, clean, and/or replace check valve removed in step (3).

(10) Restore all lines and units to original configuration.

## UTILITY SYSTEMS UPSTREAM OF CONTROL SYSTEM FILTERS - INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the utility systems upstream of the control system filters by flushing the systems with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Utility Systems Upstream of Control System Filters

   A. Wing Flap System

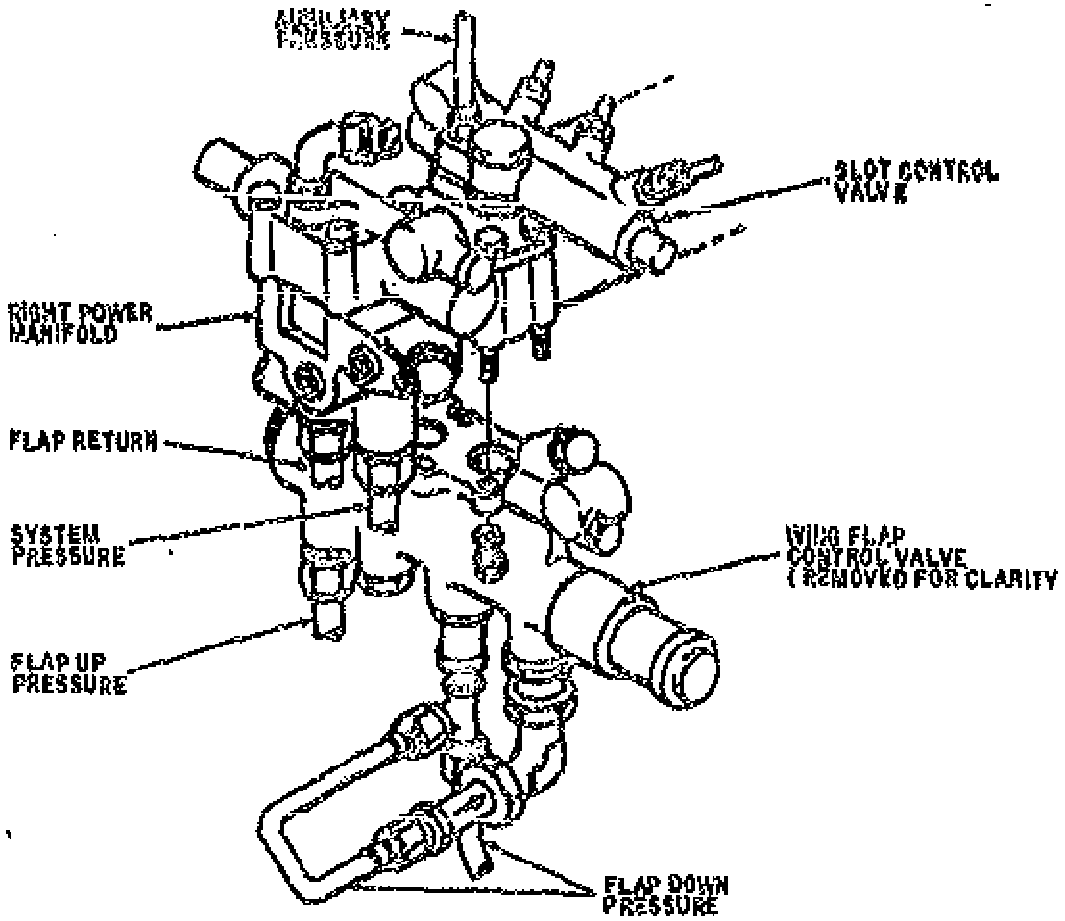
      (1) Disconnect flap up and flap down lines from wing flap control valve (see Figure 601).

      (2) Remove restrictor with portion of wing flap up line, which is connected to wing flap control valve.

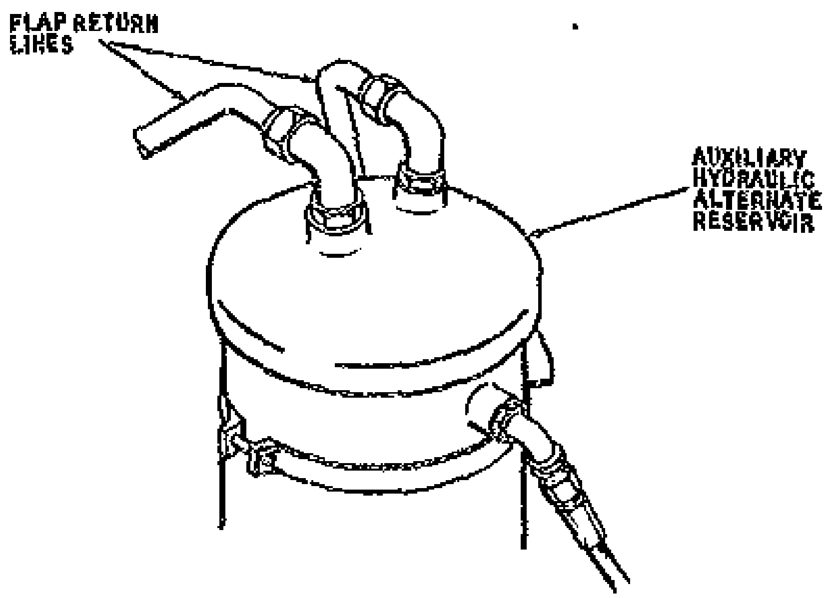
      (3) Disconnect flap return line from right power manifold just inboard of flap control valve. Jumper this line to flap down line, which was disconnected in step (1).

      (4) Connect open flap up line to test stand pressure hose.

      (5) Disconnect flap return line from inlet port of auxiliary pump alternate reservoir. Connect this line to test stand return hose.



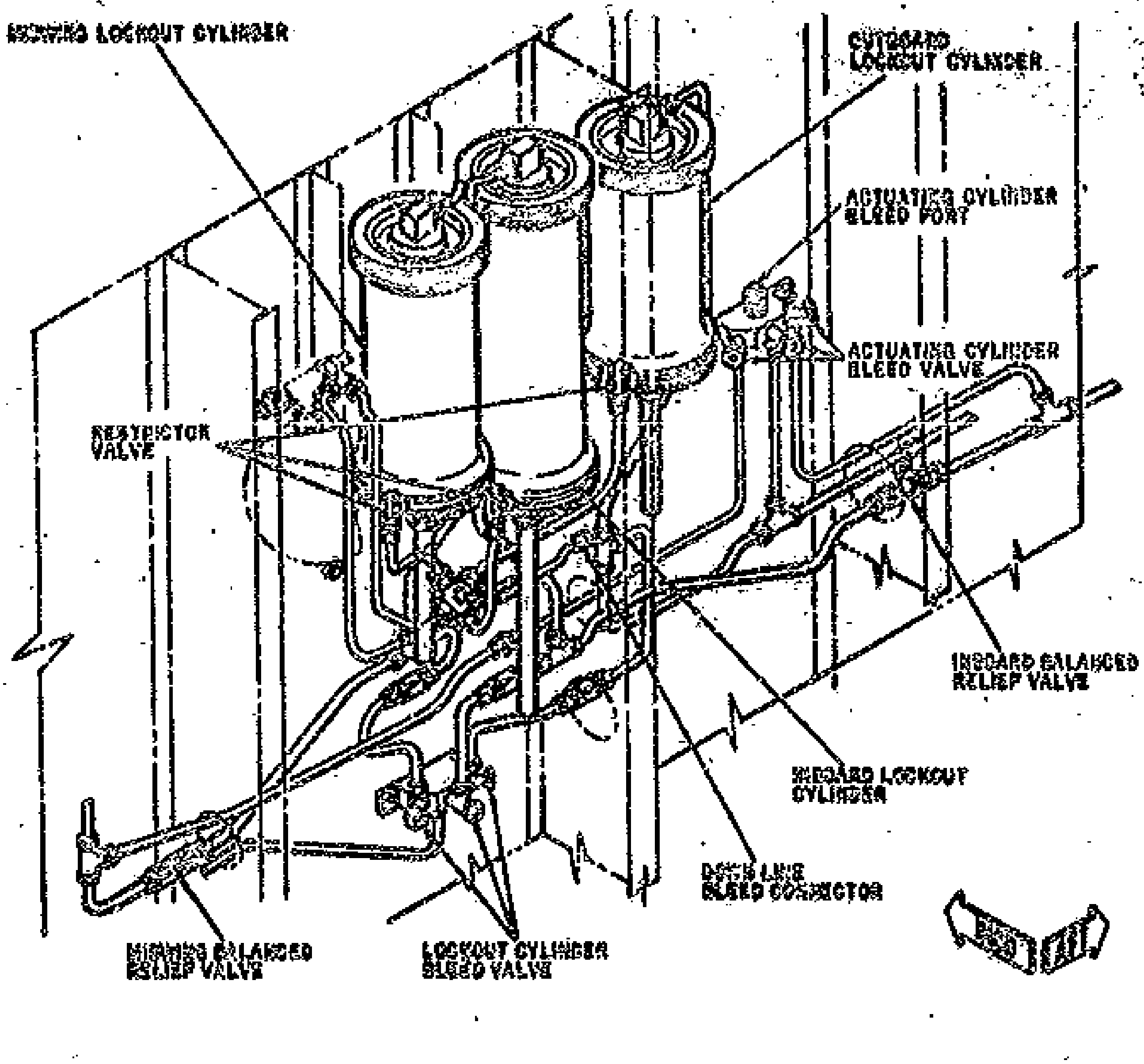

RIGHT POWER MANIFOLD




ALTERNATE RESERVOIR

HA2-6108A

Flushing Procedure Line Connection Locations
Figure 601




LEFT MAIN LANDING
GEAR WHEEL WELL

HA2-7558

(6) Remove thermal relief valve from tee in flap up line, located at 674 $X_{ws}$ = 70 in right wing root. Cap tee.

(7) Disconnect hoses from outboard flap actuating cylinders. Plug all hoses.

(8) At inboard and midwing flap actuating cylinders, disconnect flap up and flap down pressure lines and install jumper between both set of lines.

(9) Disconnect bottom line from flap lockout cylinder bleed valve manifold (see Figure 601A).

(10) Remove lines and check valves (3) from top of bleed valve manifold.

(11) Connect jumper between line disconnected in step (9) and tee fitting below inboard lockout cylinder from which check valve was removed in step (10).

(12) Disconnect lines (3) from bottom of actuating cylinder bleed valve manifold.

(13) Connect jumper between bleed line for inboard actuating cylinder and down line bleed connector.

(14) Disconnect lines from top and bottom of inboard flap lockout cylinder and connect jumper between lines.

(15) At inboard and midwing balanced relief valve, disconnect and jumper lines.

(16) Pressurize test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(17) Shut off pressure source.

(18) Disconnect jumper from tee fitting below inboard lockout cylinder and connect to line below midwing lookout cylinder from which check valve was removed in step (10).

(19) Disconnect jumper from bleed line for inboard actuating cylinder and connect to bleed line for midwing actuating cylinder.

(20) Pressurize test stand to 200 psi maximum at 20 gps flow and flush circuit for five minutes.

(21) Disconnect lines from top and bottom of inboard flap lockout cylinder and connect jumper between lines.

(22) Disconnect jumper from line below midwing lockout cylinder and connect to line below outboard lockout cylinder from which check valve was removed in step (10).

(23) Disconnect jumper from bleed line for midwing actuating cylinder and connect to bleed line for outboard actuating cylinder.

(24) At midwing flap actuating cylinders, remove jumpers. Plug flap down pressure lines.

(25) Connect jumper between midwing actuating cylinder up pressure line and outboard actuating cylinder down pressure lines.

(26) Pressure test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(27) Shut off pressure source.

(28) Disconnect test stand pressure hose from flap up line. Connect line to wing flap control valve.

(29) Disconnect auxiliary pump case drain line from inlet port on side of alternate reservoir and from case drain of auxiliary pump.

(30) Connect test stand pressure hose and return hose to drain line, flush for three minutes.

(31) Disconnect auxiliary pump suction line at alternate reservoir and auxiliary pump selector valve.

(32) Disconnect test stand pressure hose and test stand return hose from auxiliary pump case drain line, and connect to auxiliary pump suction line, flush for three minutes.

(33) Remove jumpers at all flap actuating cylinders, flap lockout cylinders, flap control valve, and actuating cylinder bleed valve manifold. Connect airplane lines to applicable component.

(34) Bench flush short lines that run between lockout cylinder bleed valve manifold and check valve (removed in step 10).

(35) Install lines and check valves on lockout cylinder bleed balve manifold.

(36) Remove and bench flush short line that runs between thermal relief valve and tee in low-pressure return line.

NOTE: Steps (37) through (47) have been deleted.

(48) Inspect, clean, and/or replace all flap actuator cylinders, lockout cylinders, thermal relief valve, balance relief valves, restrictor valve, and flap control valve.

(49) Restore all lines and units to original configuration.

(50) Adjust rigging if necessary (see Chapter 27).

B. Wing Slot System

(1) Disconnect slots open and slots closed lines from wing slot control valve, located on right power manifold (see Figure 601).

(2) Connect slots open line to test stand pressure hose. Connect slots closed line to test stand return hose.

(3) Disconnect lines from 4 slot cylinders, cap all lines except outboard right cylinder lines. Install jumper across these two lines.

(4) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(5) Flush circuit for three minutes.

(6) Depressurize test stand.

(7) Move jumper to right inboard slot cylinder lines, cap outboard lines, and repeat steps (4 through 6).

(8) Repeat steps (3 through 7) for left side. Make certain that all lines on both s des of airplane, with exception of jumpered lines, are capped.

(9) Inspect, clean, and/or replace wing slot cylinders and wing slot control valve, located on right power manifold.

(10) Restore all lines and units to original configuration. Adjust rigging if necessary per Chapter 27.

C. Main Gear Retract System (See Figures 602 and 603.)

(1) Disconnect gear up pressure line, gear down pressure line, and gear down return lines from main gear control valve.

(2) Connect jumper between gear down pressure line and gear down A-return line.

(3) Connect gear up line to test stand pressure hose.

(4) Disconnect gear down A-return line from tee in (nose gear return) A-return line, located in left wheel well aft of rear spar and below dual filter and relief valve. Connect line to test stand return hose.

(5) Disconnect right gear up and gear down lines from tees, located to right of centerline of airplane. Cap tees. Left gear retract system will be flushed first.

(6) In left wheel well, disconnect both main gear uplatch lines from tees in gear up and gear down lines. Cap tees.

(7) Disconnect both main gear door latch lines from tees in gear up and gear down lines near wing root. Cap tees.

(8) Disconnect downlock bungee pressure line from tee in gear up line. Cap tee.

(9) Disconnect line, which leads to bungee cylinder, from tee in gear down line. Cap tee.

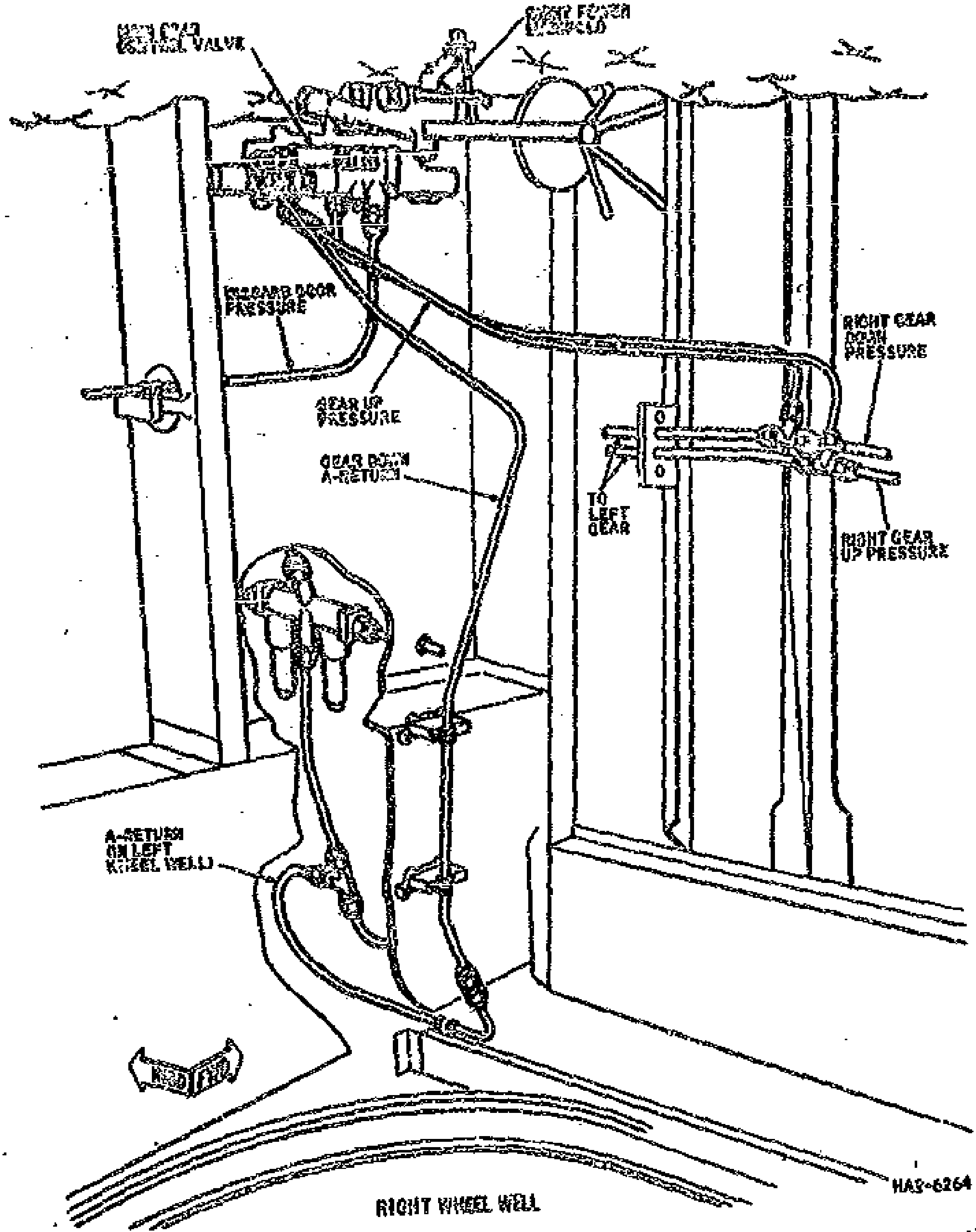
(10) Disconnect line, which leads to gear door manual open valve, from tee in main gear down line. Cap tee.

(11) Replace restrictor in gear down line with jumper.

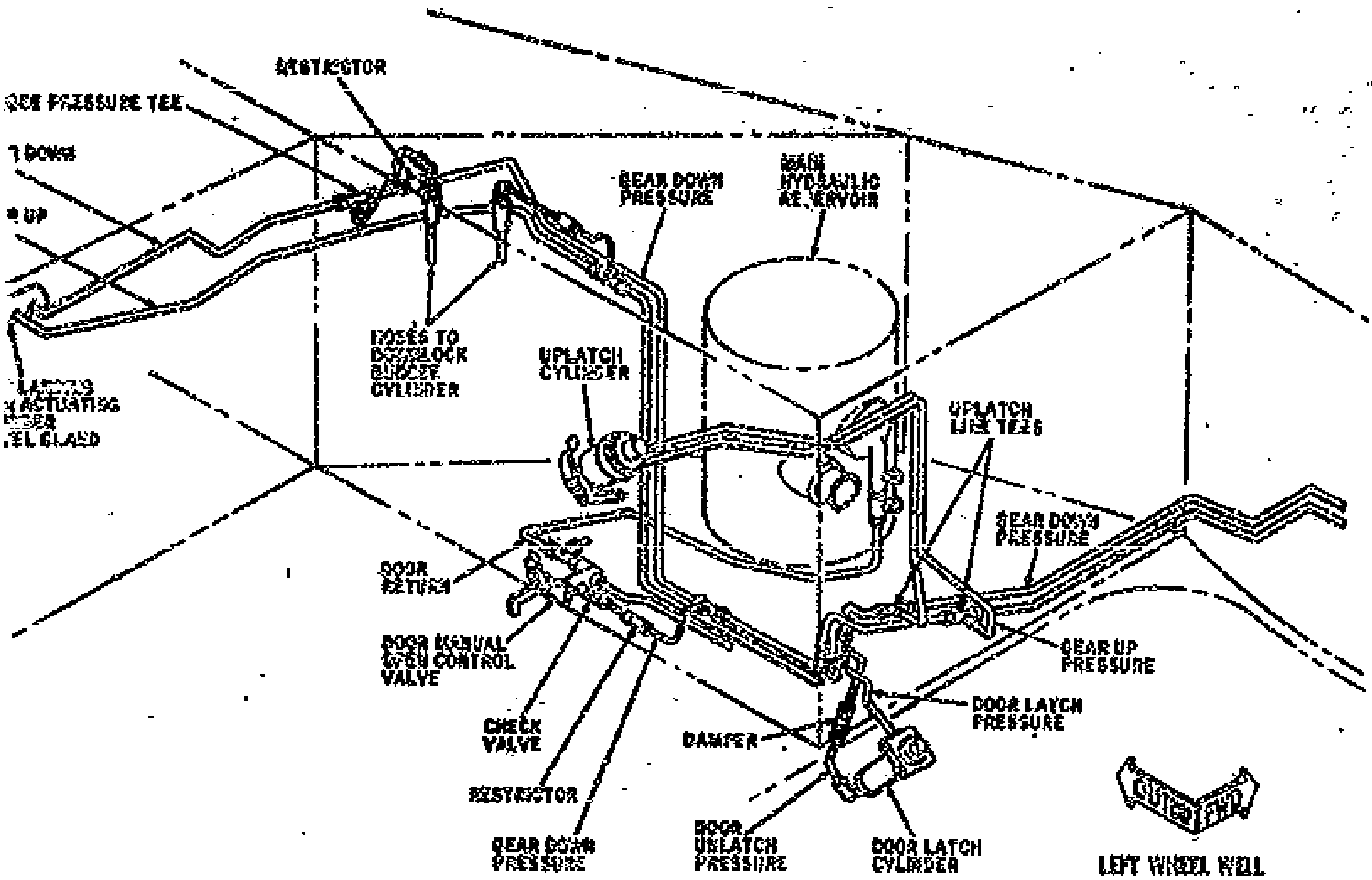
(12) Disconnect gear up and gear down lines from upstream side of actuating cylinder swivel gland. Connect jumper between these lines.

(13) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(14) Flush circuit for five minutes.




Flushing Procedure Line Connection Locations
Figure 602




Flushing Procedure Line Connection Locations
Figure 603



Printed in U.S.A.

(15) Depressurize test stand.

(16) Inspect, clean, and/or replace actuating cylinder and attaching swivel gland, door latch assembly and attaching lines (which include damper), downlock bungee cylinder and connecting lines including 2 hoses, restrictors and several short lines.

(17) Disconnect gear uplatch lines from gear uplatch cylinder and connect jumper between lines.

(18) Connect this circuit to test stand pressure and return hoses and flush for 3 minutes. Use same pressure as in step (13).

(19) Inspect, clean, and/or replace main gear uplatch cylinder.

(20) Restore all lines and units on left side of airplane to original configuration.

(21) Connect test stand pressure hose to right gear down line, and test stand return hose to right gear up line. These lines were capped in step (5).

(22) Repeat steps (6 through 20) for right side of airplane.

(23) Make any necessary adjustments per Chapter 32.

D. Main Gear Door System

(1) Disconnect right main gear door lines from bulkhead tees in center web of airplane. Cap tees.

(2) Disconnect pressure and return lines from left door actuating cylinder swivel gland. Place jumper across these lines.

(3) Disconnect door return line from inboard side of door manual open valve. Connect line to test stand return hose.

(4) Disconnect door pressure line from main gear control valve. Connect line to test stand pressure hose.

(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for three minutes.

(7) Depressurize test stand.

(8) Disconnect pressure and return lines from right door actuating cylinder swivel gland. Connect jumper across these lines.

(9) Connect test stand pressure and return hoses to lines that were capped in step (1).

(10) Repeat steps (5 through 7) for these lines.

(11) Inspect, clean, and/or replace both door actuating units, lines, and swivel glands.

(12) Inspect, clean, and/or replace door manual open valve, short line between manual open valve and tee in down line (this line includes restrictor and check valve), and line which runs from tee in manual open valve to reservoir fitting.

(13) Restore all lines and units to original configuration, and make any necessary adjustments per Chapter 32.

B. Bogie Trim and Bogie Swivel Unlock Systems (See Figure 604.)

(1) Disconnect both bogie unlock lines, and bogie trim pressure line from bogie swivel unlock control valve located on left power manifold.

(2) Connect test stand pressure hose to bogie trim pressure line, and test stand return hose to left bogie unlock line.

(3) Disconnect bogie trim pressure line, which leads to right gear, at tee located below left power manifold and to left of airplane centerline. Cap tee.

(4) Disconnect line, which runs from tee in bogie relief valve to tee in bogie trim pressure line, at bogie trim pressure line. Cap tee.

(5) Disconnect line with check valve, which runs from tee in bogie relief valve to tee in bogie unlock line, at tee. Cap tee.

(6) Install jumper lines around main gear swivel gland in bogie trim pressure line and bogie unlock line.

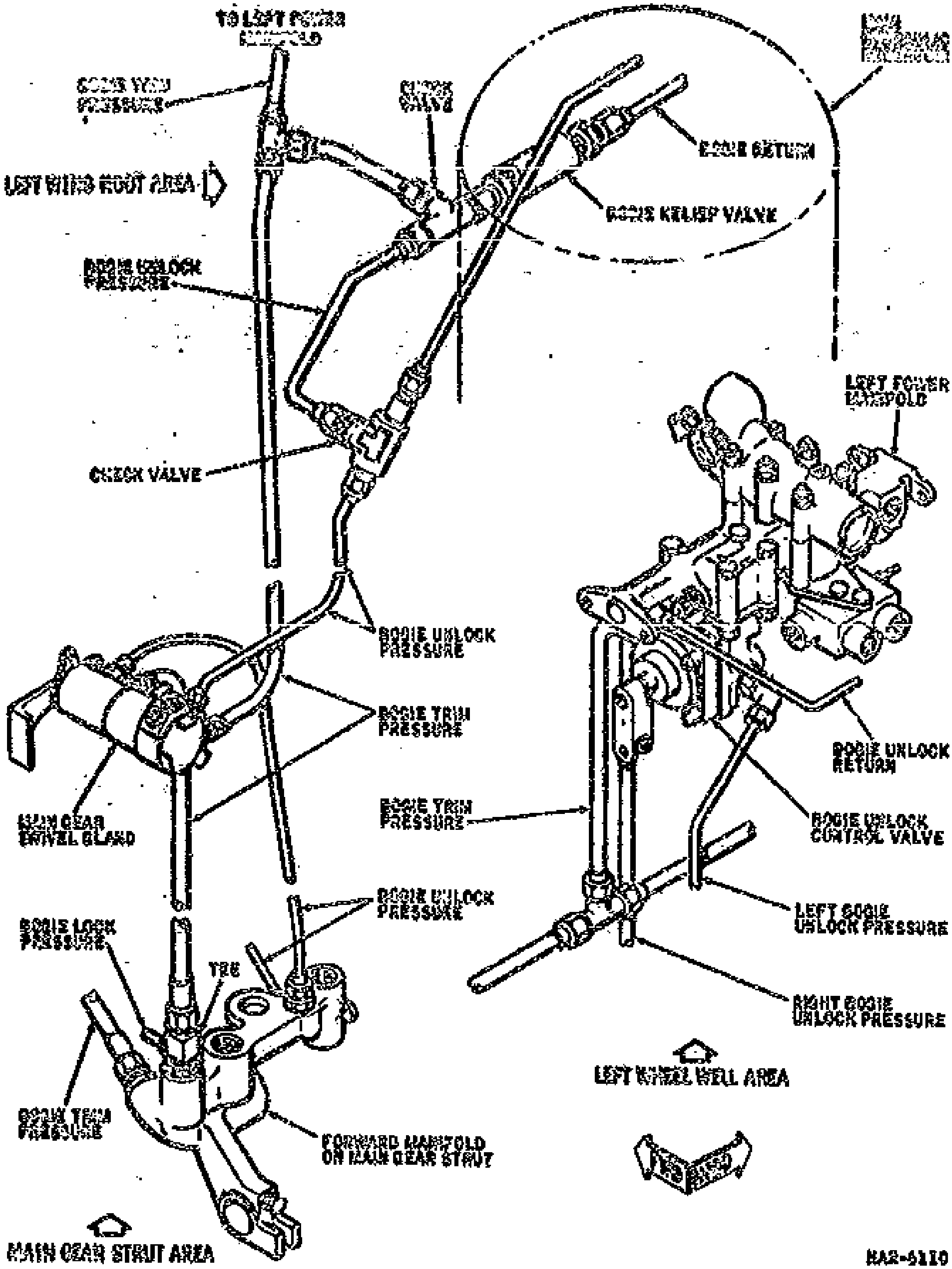
(7) Disconnect bogie trim pressure hose from manifold port below tee in forward manifold, located on shock strut above bogie beam. Cap manifold port.

(8) Disconnect both hoses from bogie unlock cylinder, and jumper these hoses together.

(9) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(10) Flush circuit for five minutes.

(11) Depressurize test stand.




Flushing Procedure Line Connection Locations
Figure 604

(12) Inspect, clean, and/or replace bogie swivel unlock valve, bogie relief valve and check valve, short lines which lead to tees in bogie trim pressure line, bogie unlock line, manual door open valve on left side of airplane, and tee in antiskid valve on right side of airplane.

(13) Inspect, clean, and/or replace swivel gland, located at top of main gear strut, bogie swivel unlock cylinder, and bogie trim cylinder with attaching hose and line.

(14) Connect right bogie trim pressure line to tee from which it was disconnected in step (3). Disconnect left bogie trim pressure line from this tee, and cap tee.

(15) Disconnect test stand return hose from left bogie unlock line and connect it to right bogie unlock line.

(16) Repeat steps (4 through 13) for right side of airplane.

(17) Restore all lines, hoses, and units to original configuration. Make adjustments as necessary per Chapter 32.

F. Nose Gear System (See Figures 605 and 606.)

(1) Disconnect nose gear down line from tee in nose gear control valve. Connect line to test stand pressure hose.

(2) Disconnect actuating cylinder gear down hose from tee in gear down line, located on left side of nosewheel well. Cap tee.

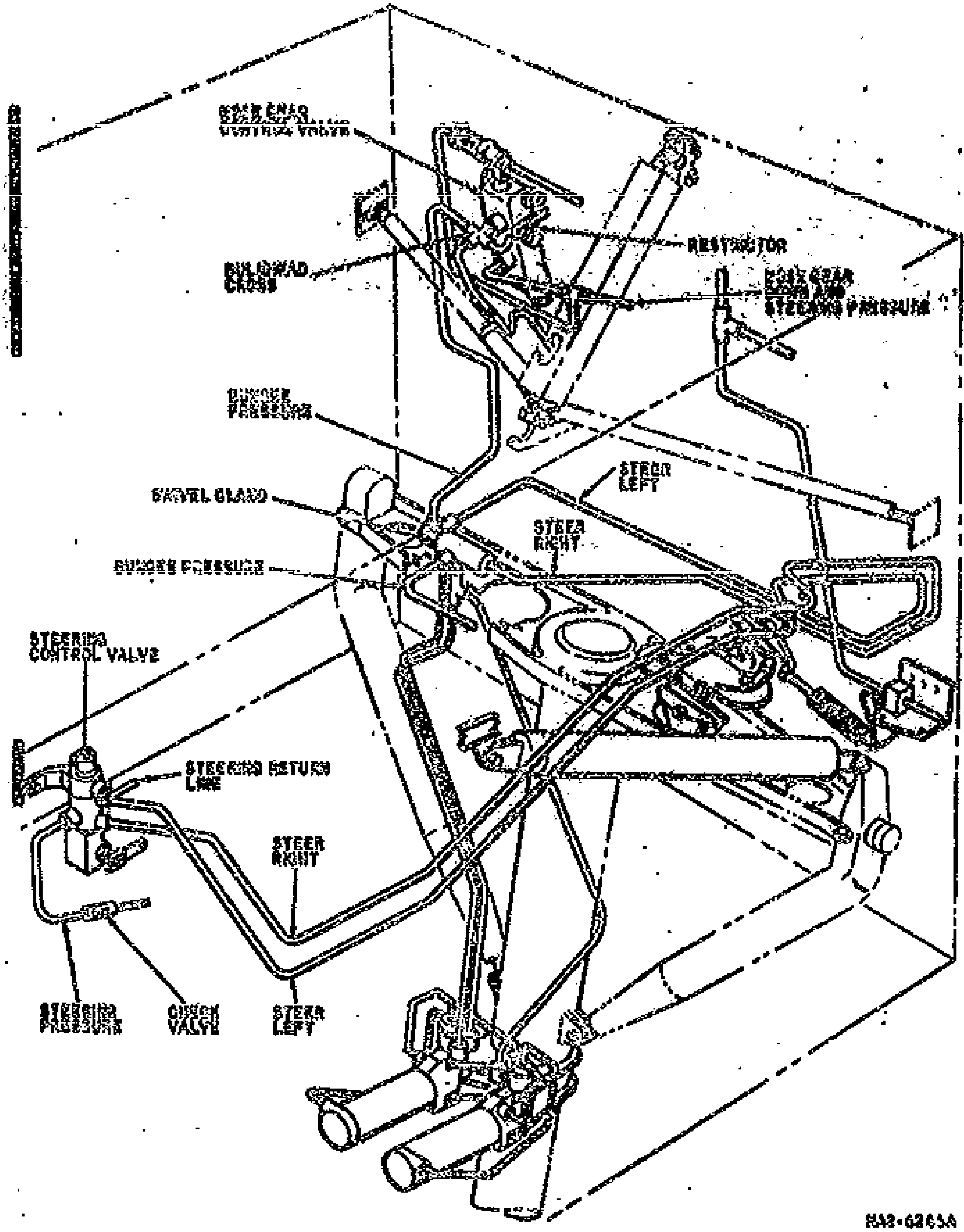
(3) Jumper check valve in steering pressure line, which runs from tee for actuating cylinder down hose to tee which branches to reserve accumulator shutoff valve and pressure line running forward.

(4) At tee between check valve, removed in step (3), and reserve accumulator shutoff valve, disconnect steering pressure line which leads forward. Cap tee.

(5) Disconnect pressure line from left side of reserve accumulator shutoff valve. Place jumper between this line and line which was disconnected in step (4).

(6) Replace check valve in steering pressure line, located aft of nosewheel steering valve, with jumper.

(7) Disconnect all four lines from steering control valve. Place jumpers between pressure line and steer right line, and between return line and steer left line.




Flushing Procedure Line Connection Locations

(8) Disconnect three 1/2-inch lines, and two 3/8-inch lines from swivel gland located on cross arm. Place jumper across two open steer left lines, located on opposite sides of swivel gland. Place jumper across two steer right lines, which were disconnected from same tee in swivel gland.

(9) Disconnect at steering cylinder glands, three steering lines which run from swivel gland on crossarm to glands at steering cylinders.

(10) Install jumper across two lines on right cylinder. On left cylinder install jumper from open line to open steer-right line upstream of swivel gland on crossarm.

(11) Disconnect steering return line from lower side of tee in steering relief valve. Disconnect gear actuating cylinder up hose at cylinder. Place jumper between this open line and hose.

(12) Disconnect 1/4-inch up line from restrictor on side away from control valve. Disconnect 1/4-inch bungee line at bulkhead cross fitting at control valve. Place jumper across these two open lines.

(13) Disconnect bungee line from top of swivel gland and connect to test stand return hose.

(14) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(15) Flush circuit for five minutes.

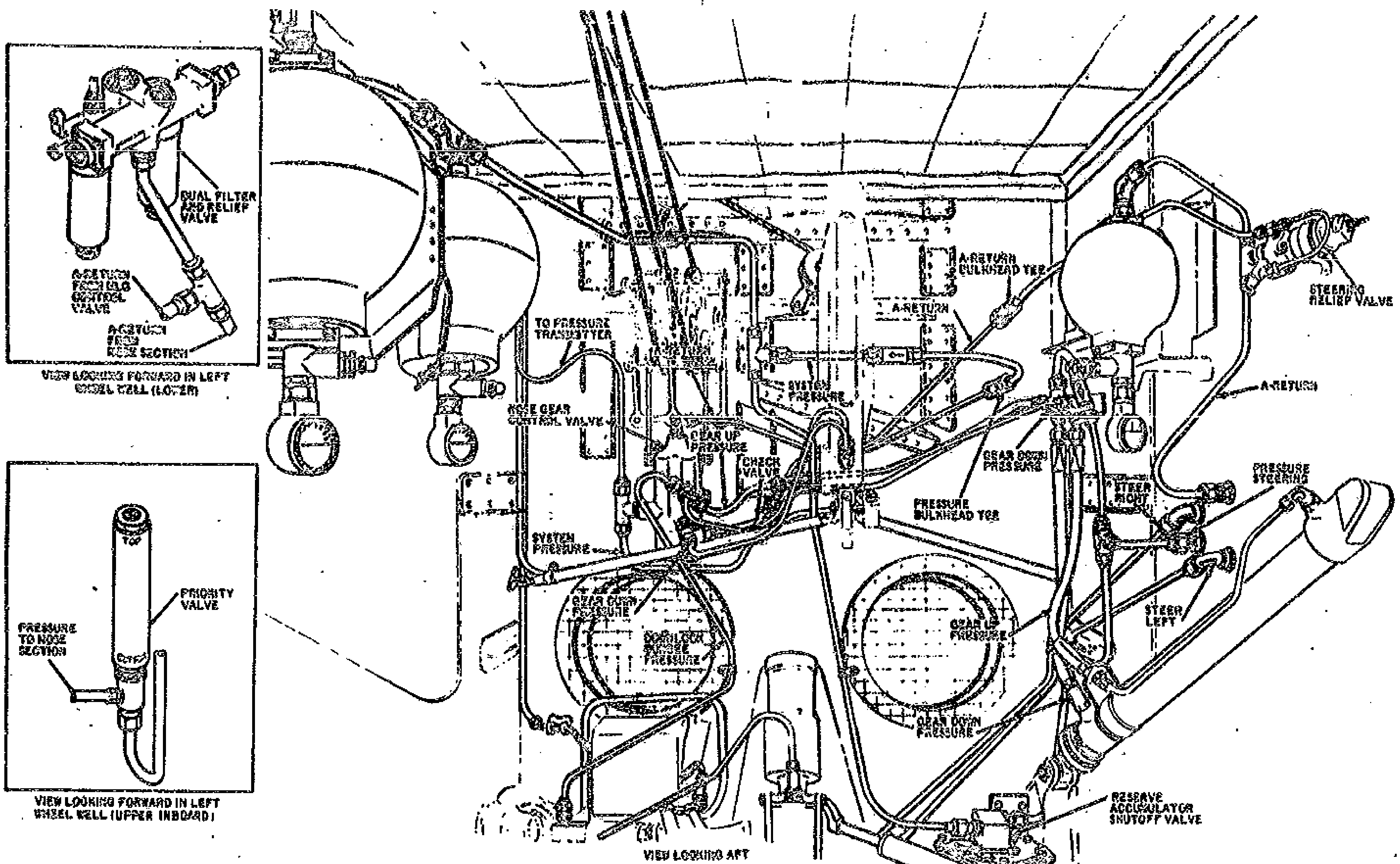
(16) Depressurize test stand.

(17) Inspect, clean, and/or replace relief valve, bleeder valve, return accumulator and two associated lines, nose gear actuating cylinder and attaching hoses, bungee cylinder and attaching line, swivel gland mounted on crossarm, uplatch cylinder and two lines which connect it to control valve.

(18) Inspect, clean, and/or replace nosewheel steering valve, located on outboard side of left side of wheel well.

(19) Inspect, clean, and/or replace nosewheel steering cylinders, restrictors, and gland assemblies and associated lines, nosewheel steering control valve, reserve accumulator shutoff valve and associated lines, and check valves.

(20) Restore all lines and units to original configuration, and make any necessary adjustments as described in Chapter 32.




Flushing Procedure Line Connection Locations
Figure 606

C. Wheel Brake System Pressure Lines

(1) Disconnect right gear brake pressure line from brake control valve, and connect test stand pressure hose to this line (see Figure 607).

(2) Disconnect two brake pressure lines from swivel gland at top of main landing gear strut. Connect these lines with a jumper line.

(3) Disconnect brake pressure line from upstream side of tee fitting at dual servo valves.

(4) Disconnect four brake pressure outlet lines from servo valves. Connect jumper line between pressure inlet line and one pressure outlet line. Cap other three outlet lines.

(5) Disconnect inlet and outlet lines and jumper fluid quantity limiter (or lockout cylinder) in outlet line connected in step (4).

(6) Disconnect brake hose from corresponding brake, and connect hose to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

(10) Disconnect jumper line from outlet line connected in step (4), cap outlet line, and connect jumper to one of other three outlet lines.

(11) Repeat steps (5 through 10) to flush remaining servo valve outlet lines.

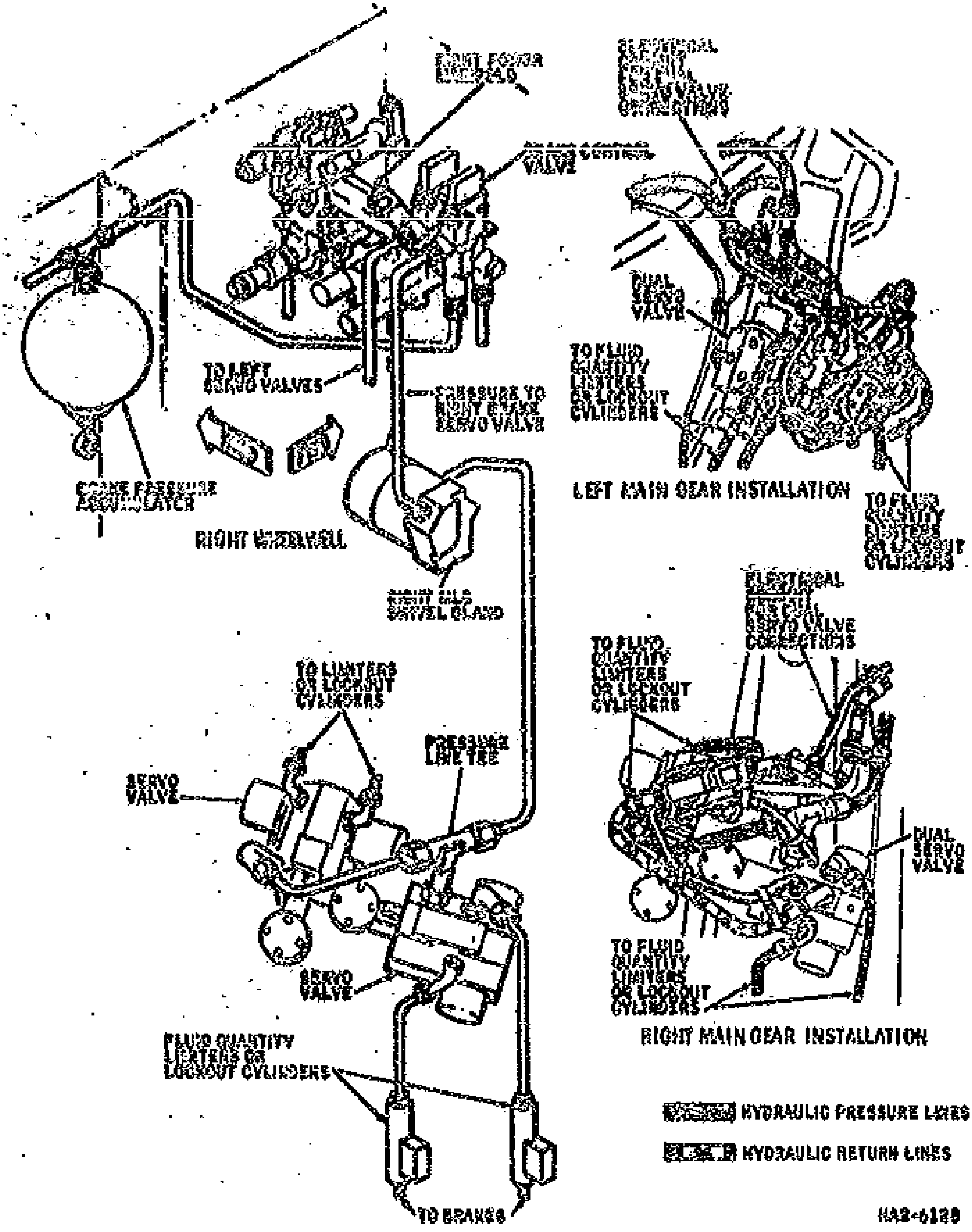
(12) Inspect, clean and/or replace brake control valve, main landing gear swivel gland, dual servo valves, fluid quantity limiters (or lockout cylinders).

(13) Disconnect test stand pressure hose from right gear brake pressure line at control valve, and connect to left gear brake pressure line at left brake control valve.

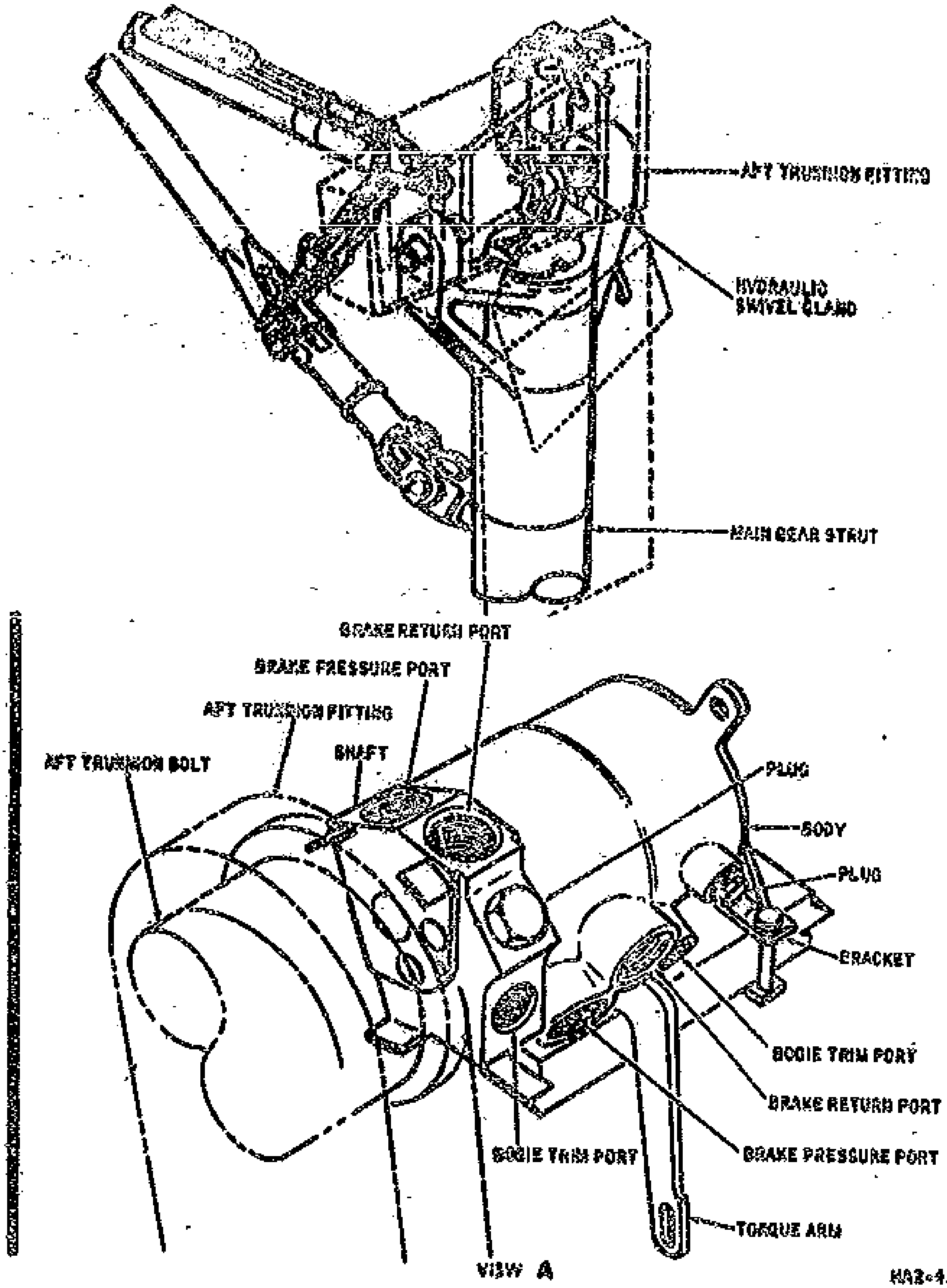
(14) Repeat steps (2 through 12) to flush left brake system pressure lines.

(15) Restore all lines and units to original configuration.

(16) To flush brake accumulators and check valve system, disconnect pressure line which runs from right power manifold to tee on accumulator. Connect test stand return hose to line that was disconnected at accumulator tee.




Flushing Procedure Line Connection Locations
Figure 607 (Sheet 1)




Flushing Procedure Line Connection Locations
Figure 607 (Sheet 2)

(17) Remove brake inlet check valve seat, spring, and poppet from right power manifold. Install seat only with seals.

(18) Remove pressure line from tee at bottom of priority valve, located below left power manifold, and connect this line to test stand pressure hose.

(19) Pressurize test stand to 200 psi at 5 to 20 gpm flow.

(20) Flush circuit for five minutes.

(21) Depressurize test stand.

(22) Remove inlet check valve seat. Examine check valve assembly for evidence of improper seating and magnetization. Install new check valve assembly if required.

(23) Remove accumulators and connecting line. Clean and flush on bench.

(24) Restore all lines and units to original configuration. Bleed and adjust brake system per Chapter 32.

H. Wheel Brake System Return Lines

(1) Disconnect right anti-skid servo valve return line at tee fitting on upper servo valve on right main gear strut. Connect test stand pressure hose to this line.

(2) Disconnect two return lines from swivel gland at top of main gear strut. Connect these lines with jumper line.

(3) Disconnect anti-skid return line from tee fitting in aileron A return line, located in right wing root area (see Figure 607). Cap A-return tee fitting.

(4) Disconnect bogie relief valve at tee and cap line.

(5) Connect test stand return hose to anti-skid line at tee disconnected in step (3).

(6) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Restore all lines and units to original configuration.

(10) Disconnect left anti-skid servo valve return line at tee fitting on upper servo valve on left main gear strut. Connect test stand pressure hose to this line.

(11) Disconnect two return lines from swivel gland at top of main gear strut. Connect these lines with jumper line.

(12) Disconnect left bogie relief valve from anti-skid return line at tee fitting. Cap line and tee.

(13) Disconnect left anti-skid return line from cross fitting in case drain return port of main reservoir. Cap cross fitting.

(14) Connect test stand return hose to this line.

(15) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(16) Flush circuit for five minutes.

(17) Depressurize test stand.

(18) Restore all lines and units to original configuration.

## UTILITY FLUSHING UPSTREAM OF CONTROL SYSTEM FILTERS - INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the utility systems upstream of the control system filters by flushing the systems with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Utility Systems Upstream of Control System Filters

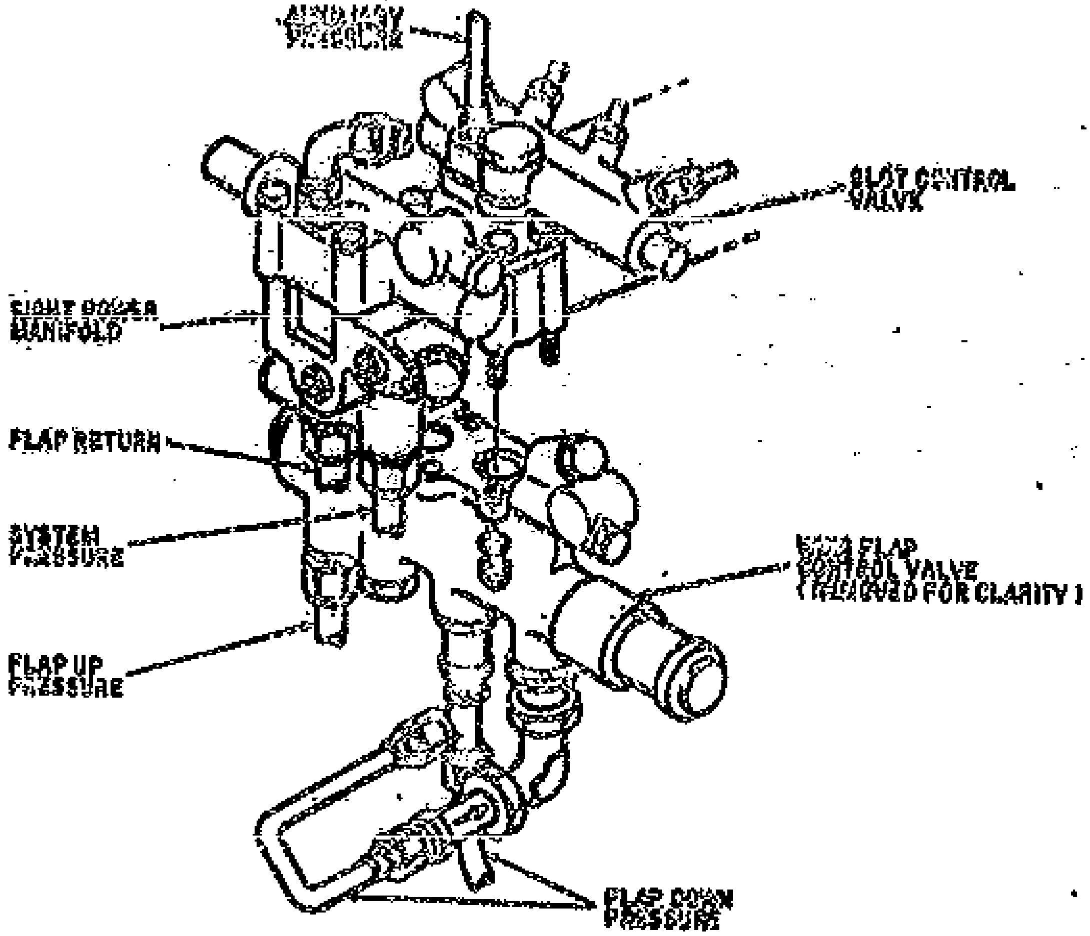
   A. Wing Flap System

      (1) Disconnect flap up and flap down lines from wing flap control valve (see Figure 601).

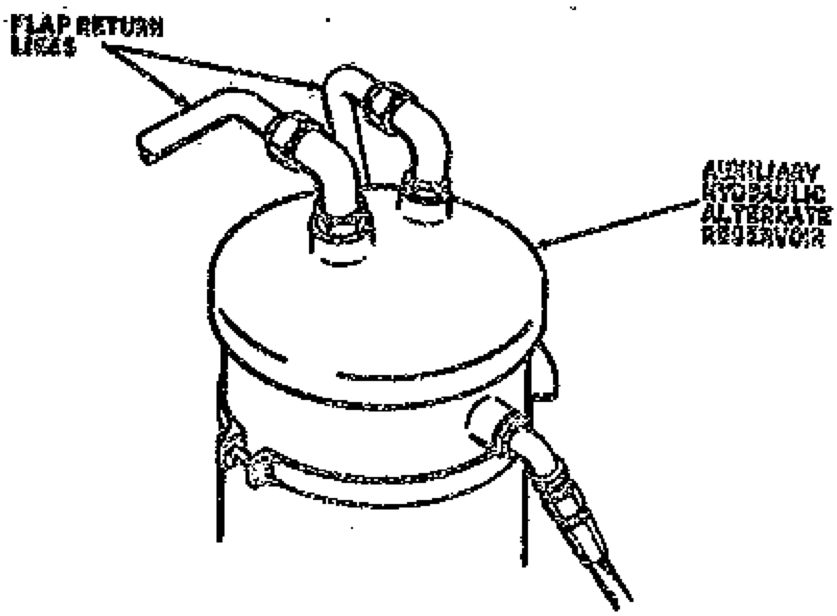
      (2) Remove restrictor with portion of wing flap up line, which is connected to wing flap control valve.

      (3) Disconnect flap return line from right power manifold just inboard of flap control valve. Jumper this line to flap down line, which was disconnected in step (1).

      (4) Connect open flap up line to test stand pressure hose.



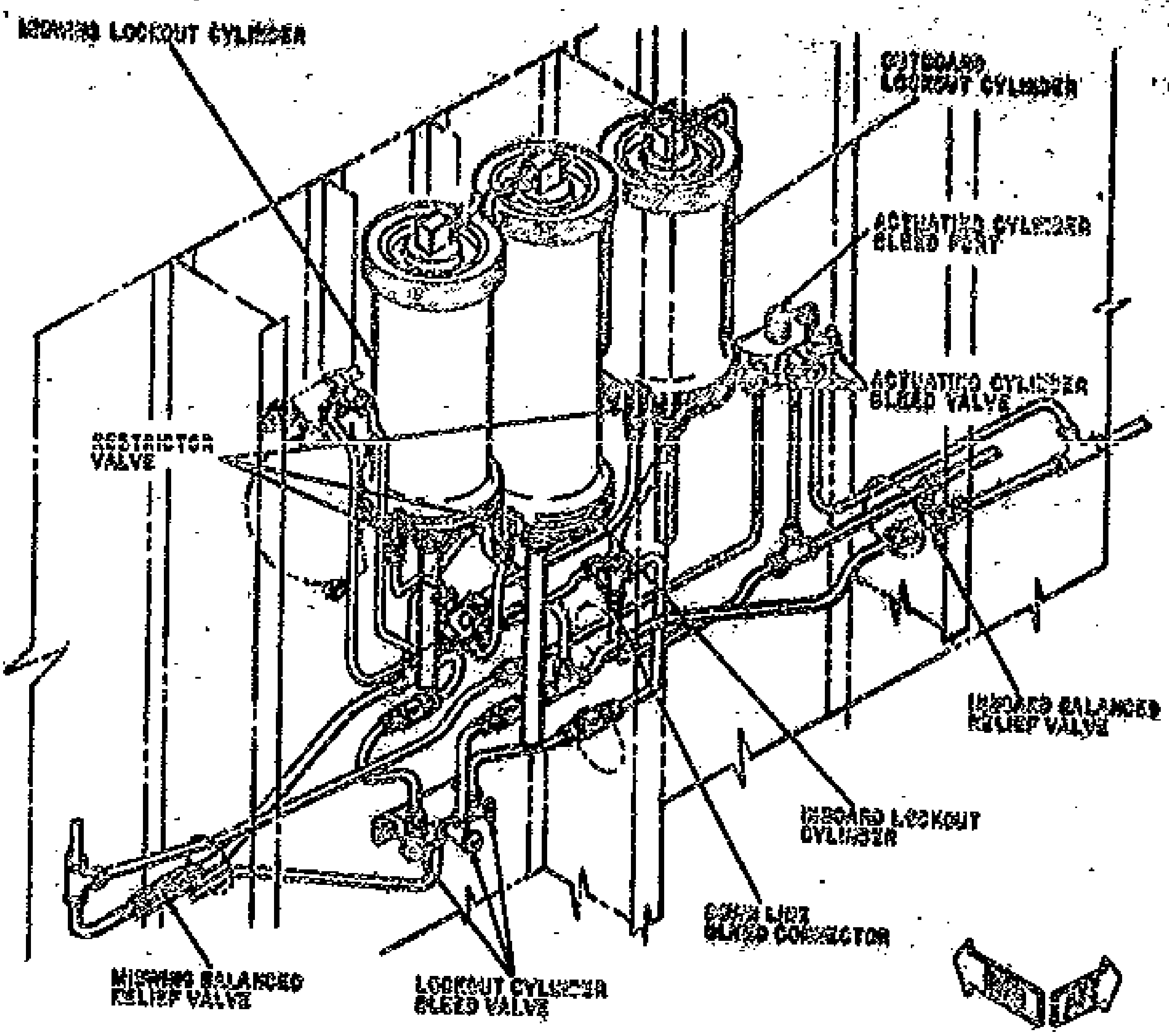

RIGHT POWER MANIFOLD




ALTERNATE RESERVOIR

HA2-6102A

Flushing Procedure Line Connection Locations
Figure 601




LEFT MAIN LANDING GEAR WHEEL WELL

Flushing Procedures -- Line Connection Location
Figure 601A

(5) Disconnect flap return line from inlet port of auxiliary pump alternate reservoir. Connect this line to test stand return hose.

(6) Remove thermal relief valve from tee in flap up line, located at STA $X_{rs}$ = 70 in right wing root. Cap tee.

(7) Disconnect hoses from outboard flap actuating cylinders. Plug all hoses.

(8) At inboard and midwing flap actuating cylinders, disconnect flap up and flap down pressure lines and install jumper between both set of lines.

(9) Disconnect bottom line from flap lockout cylinder bleed valve manifold. (see Figure 601A).

(10) Remove lines and check valves (3) from top of bleed valve manifold.

(11) Connect jumper between line disconnected in step (9) and tee fitting below inboard lockout cylinder from which check valve was removed in step (10).

(12) Disconnect lines (3) from bottom of actuating cylinder bleed valve manifold.

(13) Connect jumper between bleed line for inboard actuating cylinder and down line bleed connector.

(14) Disconnect lines from top and bottom of inboard flap lockout cylinder and connect jumper between lines.

(15) At inboard and midwing balanced relief valve, disconnect and jumper lines.

(16) Pressurize test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(17) Shut off pressure source.

(18) Disconnect jumper from tee fitting below inboard lockout cylinder and connect to line below midwing lockout cylinder from which check valve was removed in step (10).

(19) Disconnect jumper from bleed line for inboard actuating cylinder and connect to bleed line for midwing actuating cylinder.

(20) Pressurize test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(21) Disconnect lines from top and bottom of inboard flap lockout cylinder and connect jumper between lines.

(22) Disconnect jumper from line below midwing lockout cylinder and connect to line below outboard lockout cylinder from which check valve was removed in step (10).

(23) Disconnect jumper from bleed line for midwing actuating cylinder and connect to bleed line for outboard actuating cylinder.

(24) At midwing flap actuating cylinders, remove jumpers. Plug flap down pressure lines.

(25) Connect jumper between midwing actuating cylinder up pressure line and outboard actuating cylinder down pressure lines.

(26) Pressurize test stand to 800 psi maximum at 20 gpm flow and flush circuit for five minutes.

(27) Shut off pressure source.

(28) Disconnect test stand pressure hose from flap up line. Connect line to wing flap control valve.

(29) Disconnect auxiliary pump case drain line from inlet port on side of alternate reservoir and from case drain of auxiliary pump.

(30) Connect test stand pressure hose and return hose to drain line, flush for three minutes.

(31) Disconnect auxiliary pump suction line at alternate reservoir and auxiliary pump selector valve.

(32) Disconnect test stand pressure hose and test stand return hose from auxiliary pump case drain line, and connect to auxiliary pump suction line, flush for three minutes.

(33) Remove jumpers at all flap actuating cylinders, flap lockout cylinders, flap control valve, and actuating cylinder bleed valve manifold. Connect airplane lines to applicable component.

(34) Bench flush short lines that run between lockout cylinder bleed valve manifold and check valve (removed in step 10).

(35) Install lines and check valves on lockout cylinder bleed valve manifold.

(36) Remove and bench flush short line that runs between thermal relief valve and tee in low-pressure return line.

**NOTE:** Steps (37) through (47) have been deleted.

(47) Remove and bench flush short line that runs between thermal relief valve and tee in low-pressure return line.

(48) Inspect, clean, and/or replace all flap actuator cylinders, lockout cylinders, thermal relief valve, balanced relief valves, restrictor valve, and flap control valve.

(49) Restore all lines and units to original configuration.

(50) Adjust rigging if necessary (see Chapter 27).

B. Wing Slot System

(1) Disconnect slots open and slots closed lines from wing slot control valve, located on right power manifold (see Figure 601).

(2) Connect slots open line to test stand pressure hose. Connect slots closed line to test stand return hose.

(3) Disconnect lines from 4 slot cylinders, cap all lines except outboard right cylinder lines. Install jumper across those two lines.

(4) Pressurize test stand to 200 psi maximum at 50 gpm flow.

(5) Flush circuit for three minutes.

(6) Depressurize test stand.

(7) Move jumper to right inboard slot cylinder lines, cap outboard lines, and repeat steps (4 through 6).

(8) Repeat steps (3 through 7) for left side. Make certain that all lines on both sides of airplane, with exception of jumpered lines, are capped.

(9) Inspect, clean, and/or replace wing slot cylinders and wing slot control valve, located on right power manifold.

(10) Restore all lines and units to original configuration. Adjust rigging if necessary per Chapter 27.

C. Main Gear Retract System (See Figures 602 and 603.)

(1) Disconnect gear up pressure line, gear down pressure line, and gear down return lines from main gear control valve.

(2) Connect jumper between gear down pressure line and gear down A-return line.

(3) Connect gear up line to test stand pressure hose.

(4) Disconnect gear down A-return line from tee in (nose gear return) A-return line, located in left wheel well aft of rear spar and below dual filter and relief valve. Connect line to test stand return hose.

(5) Disconnect right gear up and gear down lines from tees, located to right of centerline of airplane. Cap tees. Left gear retract system will be flushed first.

(6) In left wheel well, disconnect both main gear uplatch lines from tees in gear up and gear down lines. Cap tees.

(7) Disconnect both main gear door latch lines from tees in gear up and gear down lines near wing root. Cap tees.

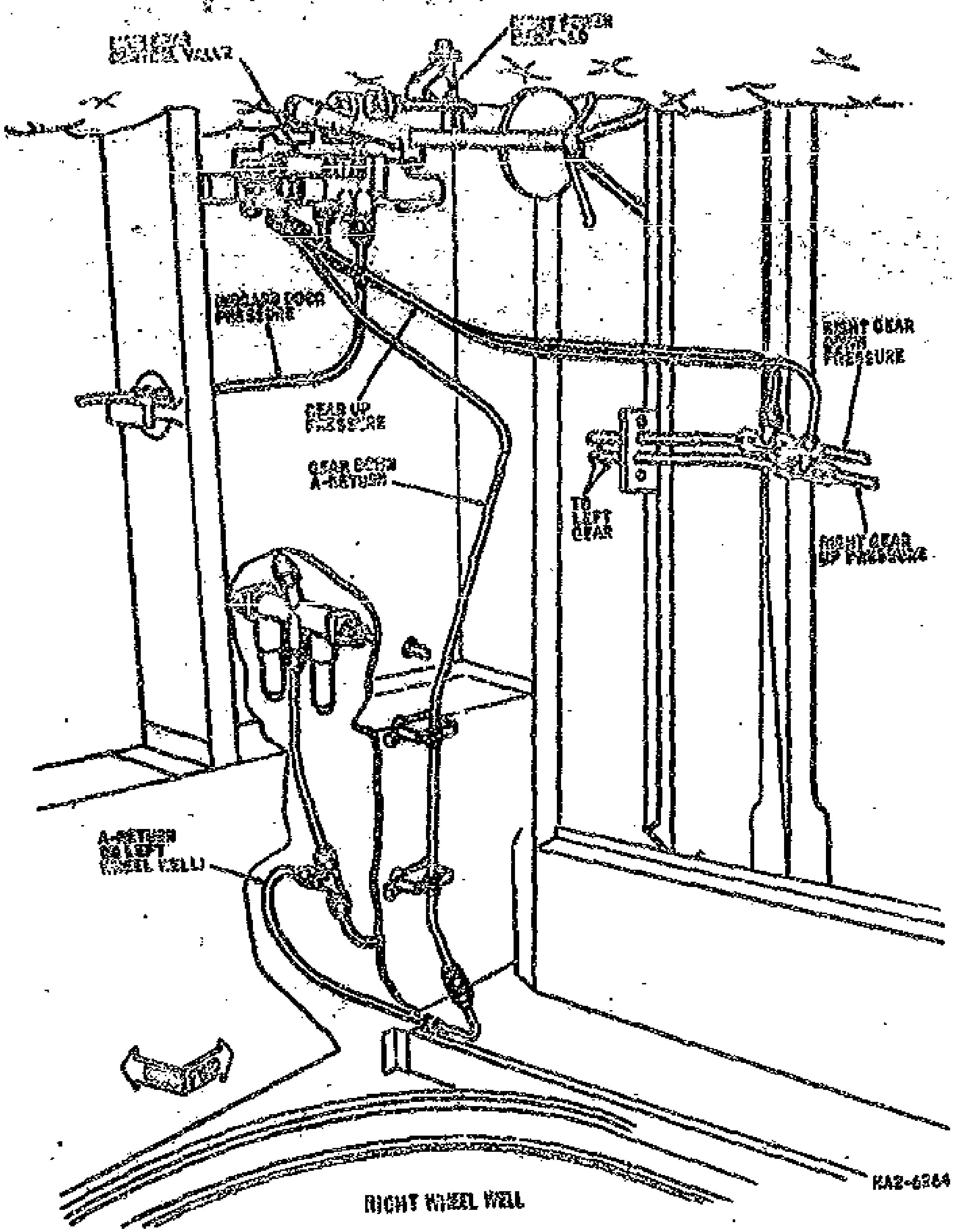
(8) Disconnect downlock bungee pressure line from tee in gear up line. Cap tee.

(9) Disconnect line, which leads to bungee cylinder, from tee in gear down line. Cap tee.

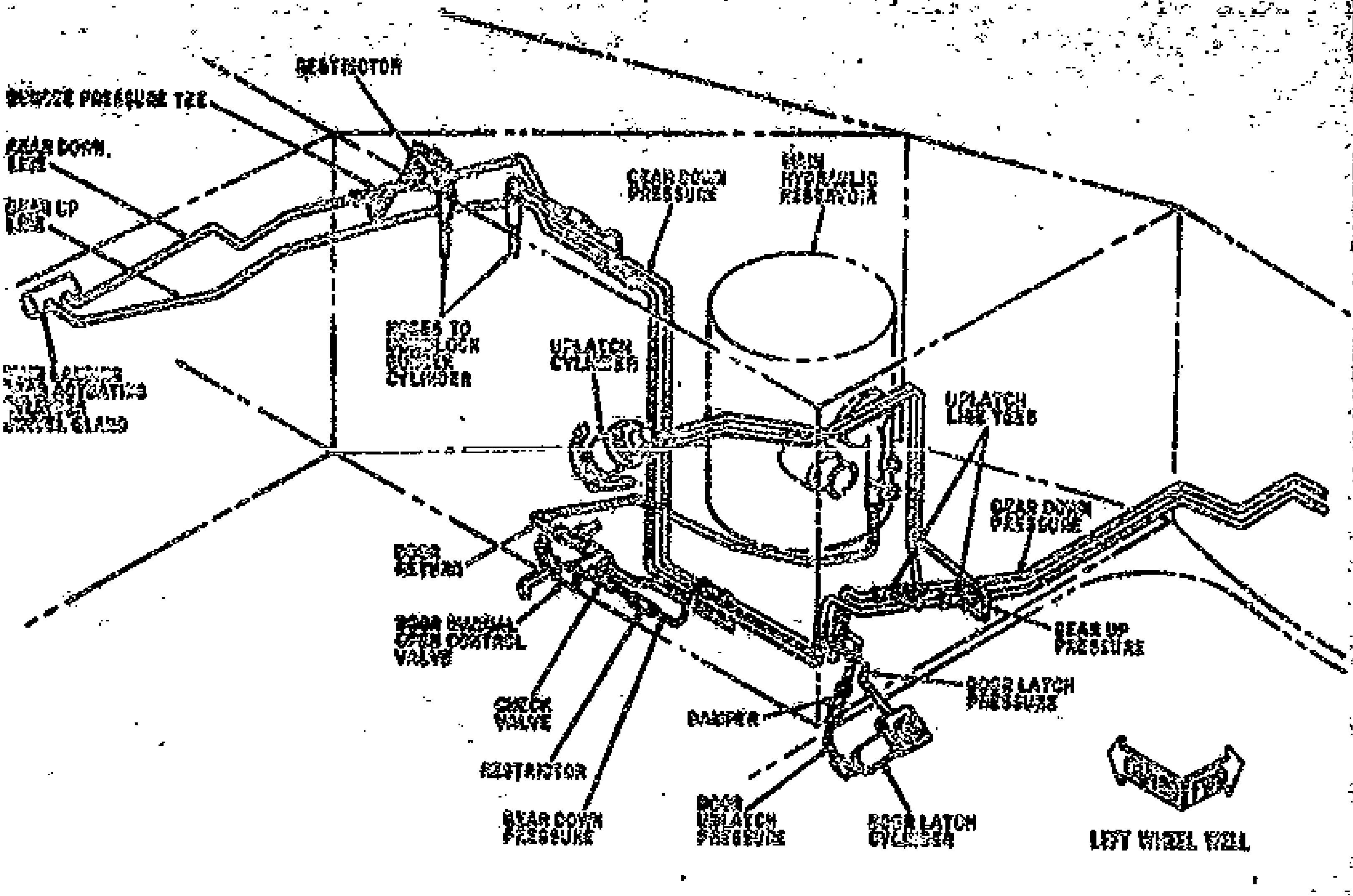
(10) Disconnect line, which leads to gear door manual open valve, from tee in main gear down line. Cap tee.

(11) Replace restrictor in gear down line with jumper.

(12) Disconnect gear up and gear down lines from upstream side of actuating cylinder swivel gland. Connect jumper between these lines.




Flushing Procedure Line Connection Locations
Figure 602




Flushing Procedure Line Connection Locations
Figure 603

(13) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(14) Flush circuit for five minutes.

(15) Depressurize test stand.

(16) Inspect, clean, and/or replace actuating cylinder and attaching swivel gland, door latch assembly and attaching lines (which include damper), downlock bungee cylinder and connecting lines including 2 hoses, restrictors and several short lines.

(17) Disconnect gear uplatch lines from gear uplatch cylinder and connect jumper between lines.

(18) Connect this circuit to test stand pressure and return hoses and flush for 3 minutes. Use same pressure as in step (13).

(19) Inspect, clean, and/or replace main gear uplatch cylinder.

(20) Restore all lines and units on left side of airplane to original configuration.

(21) Connect test stand pressure hose to right gear down line, and test stand return hose to right gear up line. These lines were capped in step (5).

(22) Repeat steps (6 through 20) for right side of airplane.

(23) Make any necessary adjustments per Chapter 32.

D. Main Gear Door System

(1) Disconnect right main gear door lines from bulkhead tees in center web of airplane. Cap tees.

(2) Disconnect pressure and return lines from left door actuating cylinder swivel gland. Place jumper across these lines.

(3) Disconnect door return line from inboard side of door manual open valve. Connect line to test stand return hose.

(4) Disconnect door pressure line from main gear control valve. Connect line to test stand pressure hose.

(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for three minutes.

(7) Depressurize test stand.

(8) Disconnect pressure and return lines from right door actuating cylinder swivel gland. Connect jumper across these lines.

(9) Connect test stand pressure and return hoses to lines that were capped in step (1).

(10) Repeat steps (5 through 7) for these lines.

(11) Inspect, clean, and/or replace both door actuating units, lines, and swivel glands.

(12) Inspect, clean, and/or replace door manual open valve, short line between manual open valve and tee in down line (this line includes restrictor and check valve), and line which runs from tee in manual open valve to reservoir fitting.

(13) Restore all lines and units to original configuration, and make any necessary adjustments per Chapter 32.

E. Bogie Trim and Bogie Swivel Unlock Systems (See Figure 604.)

(1) Disconnect both bogie unlock lines, and bogie trim pressure line from bogie swivel unlock control valve located on left power manifold.

(2) Connect test stand pressure hose to bogie trim pressure line, and test stand return hose to left bogie unlock line.

(3) Disconnect bogie trim pressure line, which leads to right gear, at tee located below left power manifold and to left of airplane centerline. Cap tee.

(4) Disconnect line with check valve, which runs from tee in bogie relief valve to tee in bogie unlock line, at tee. Cap tee.

(5) Install jumper lines around main gear swivel gland in bogie trim pressure line and bogie unlock line.

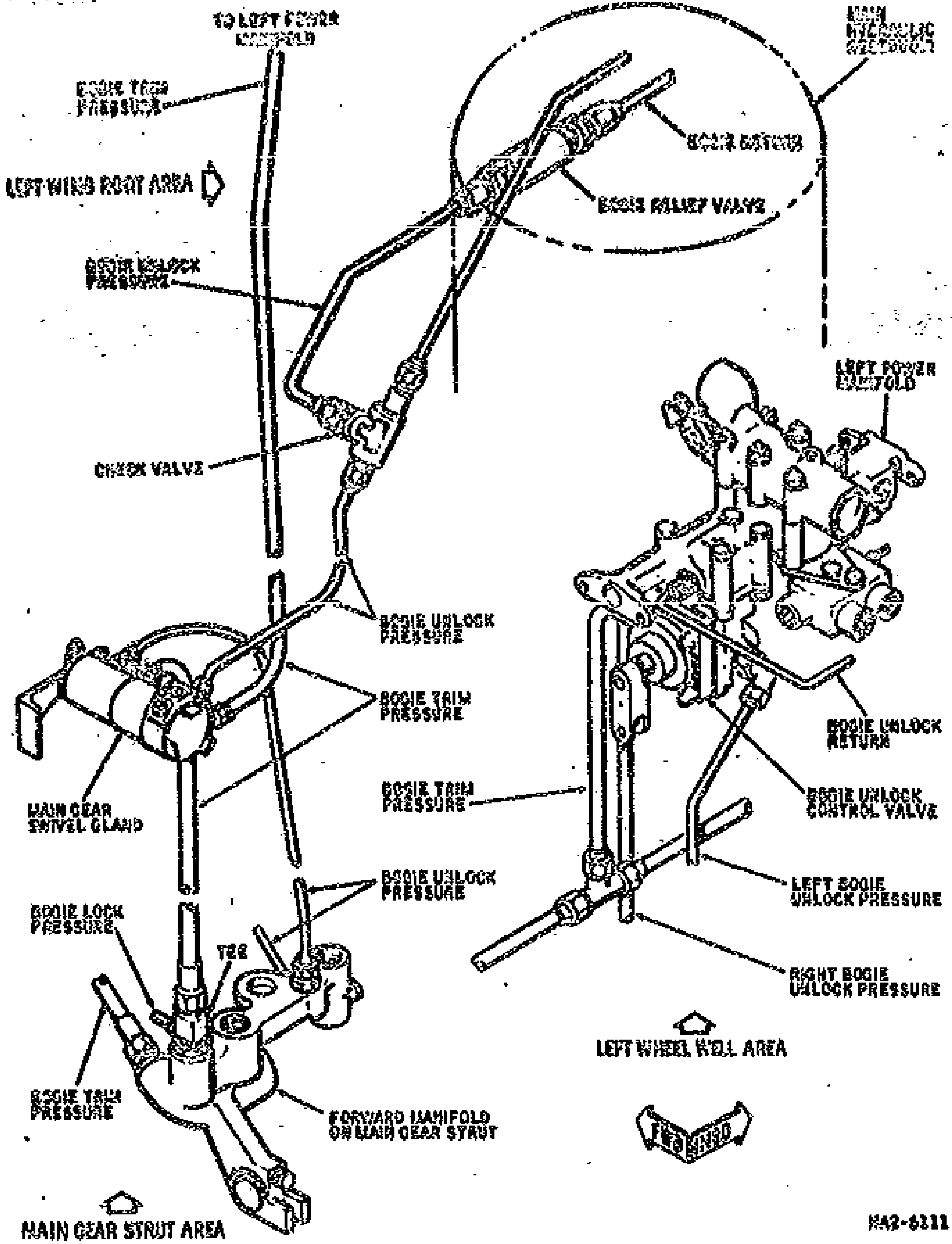
(6) Disconnect bogie trim pressure hose from manifold port below tee in forward manifold, located on shock strut above bogie beam. Cap manifold.

(7) Disconnect both hoses from bogie unlock cylinder, and jumper these hoses together.

(8) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(9) Flush circuit for five minutes.

(10) Depressurize test stand.




Flushing Procedure Line Connection Locations
Figure 604

(11) Inspect, clean, and/or replace bogie swivel unlock valve, bogie relief valve and check valve, three short lines which lead to tees in bogie trim pressure line, bogie unlock line, manual door open valve on left side of airplane, and tee in antiskid valve on right side of airplane.

(12) Inspect, clean, and/or replace swivel gland, located at top of main gear strut, bogie swivel unlock cylinder, and bogie trim cylinder with attaching hose and line.

(13) Connect right bogie trim pressure line to tee from which it was disconnected in step (3). Disconnect left bogie trim pressure line from this tee, and cap tee.

(14) Disconnect test stand return hose from left bogie unlock line and connect it to right bogie unlock line.

(15) Repeat steps (4 through 12) for right side of airplane.

(16) Restore all lines, hoses, and units to original configuration. Make adjustments as necessary per Chapter 32.

F. Nose Gear System (See Figures 605 and 606.)

(1) Disconnect nose gear down line from tee just inboard of nose gear control valve. Connect line to test stand pressure hose.

(2) Disconnect actuating cylinder gear down hose from tee in gear down line, located on left side of nosewheel well. Cap tee.

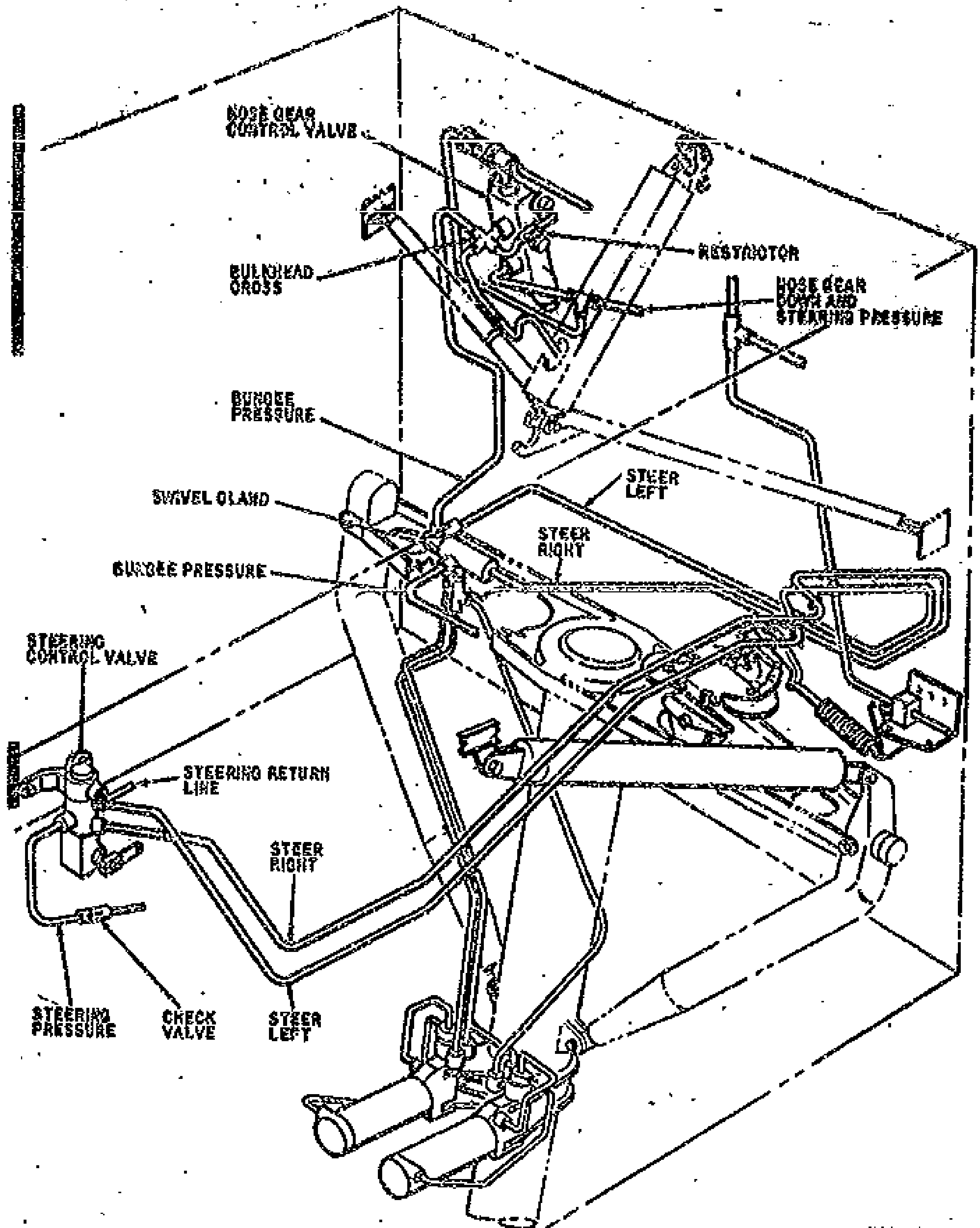
(3) Jumper check valve in steering pressure line, which runs from tee for actuating cylinder down hose to tee which branches to reserve accumulator shutoff valve and pressure line running forward.

(4) At tee between check valve, removed in step (3), and reserve accumulator shutoff valve, disconnect steering pressure line which leads forward. Cap tee.

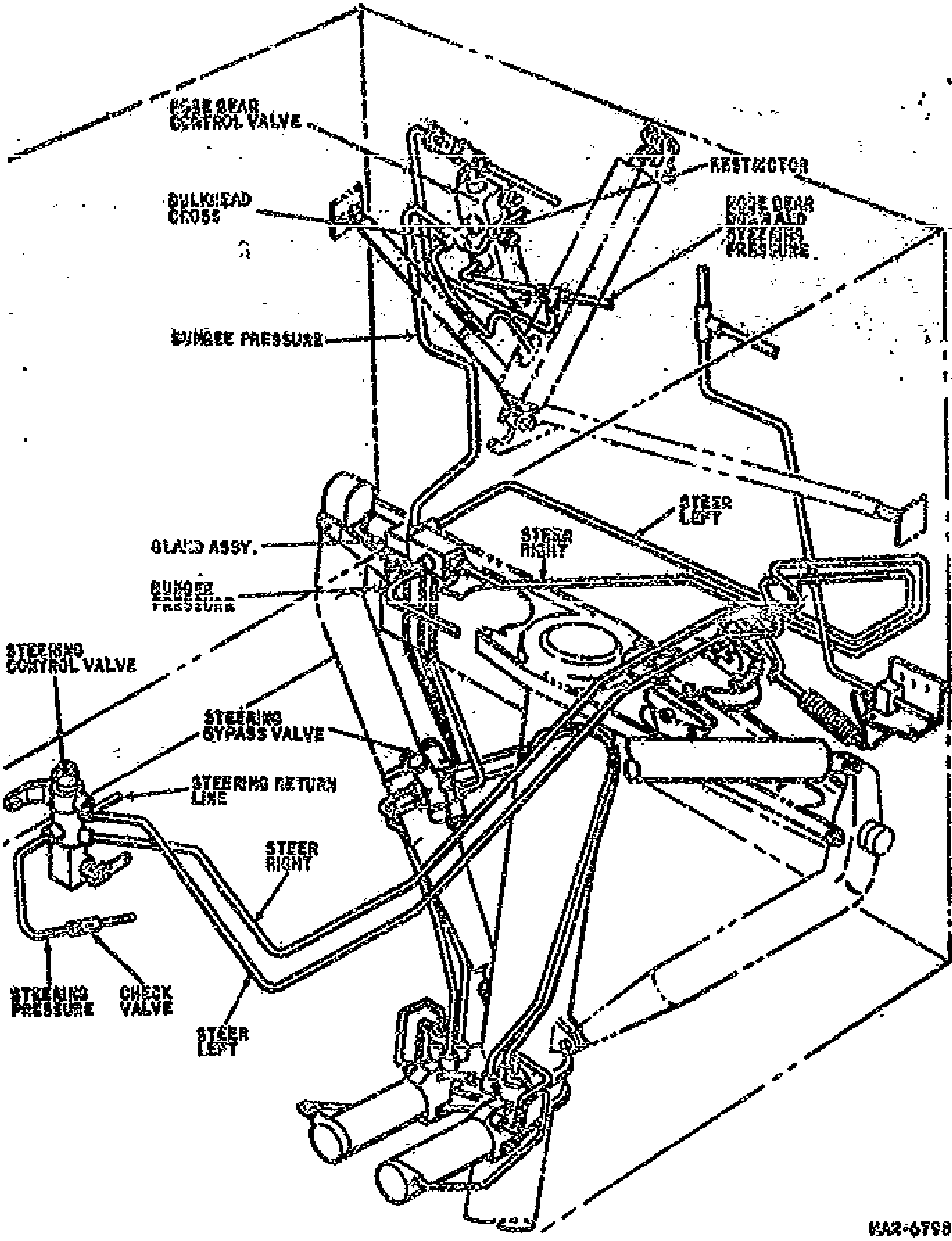
(5) Disconnect pressure line from left side of reserve accumulator shutoff valve. Place jumper between this line and line which was disconnected in step (4).

(6) Replace check valve in steering pressure line, located aft of nosewheel steering valve, with jumper.

(7) Disconnect all four lines from steering control valve. Connect jumpers between pressure line and steer right line, and between return line and steer left line.




Flushing Procedure Line Connection Locations
(Airplanes Without Steering Bypass Valve)
Figure 605




MA2-6798

Flushing Procedure Line Connection Locations
(Airplanes With Steering Bypass Valve)
Figure 605A

(8) On airplanes without nose gear steering bypass valve, perform steps (a) through (c).

(a) Disconnect five steering lines from swivel gland and tee located on cross arm. Connect jumper across two open steer left lines located on opposite sides of swivel gland. Connect jumper across two steer right lines which were disconnected from same tee in swivel gland.

(b) Disconnect at steering cylinder glands, three steering lines which run from swivel gland on crossarm to glands at steering cylinders.

(c) Install jumper across two lines on right cylinder. On left cylinder, install jumper from open line to open steer-right line upstream of swivel gland on crossarm.

(9) On airplanes equipped with nose gear steering bypass valve, perform steps (a) through (h).

(a) Disconnect four steering lines from swivel gland located on cross arm. Connect jumper across two open steer left lines. Connect jumper across two open steer right lines.

(b) At steering relief valve, disconnect six steering lines.

(c) Connect jumper between steer left inlet line and one of steering lines to right steering cylinder.

(d) Connect jumper between steer right inlet line and one of steering lines to left steering cylinder.

(e) Jumper remaining left cylinder line to remaining right cylinder line.

(f) Disconnect and jumper two lines at right steering cylinder swivel glands.

(g) Disconnect and jumper two lines at left steering cylinder swivel glands.

(h) Disconnect and remove for cleaning, short bypass valve return line between cross arm swivel gland and bypass valve.

(10) Disconnect steering return line from lower side of tee in steering relief valve. Disconnect gear actuating cylinder up hose at cylinder. Connect jumper between this open line and hose.

(11) Disconnect 1/4-inch up line from restrictor on side away from control valve. Disconnect 1/4-inch bungee line at bulkhead cross fitting at control valve. Connect jumper across these two open lines.

(12) On airplanes without nose gear steering bypass valve, disconnect bungee line from top of swivel gland and connect to test stand return hose.

(13) On airplanes equipped with nose gear steering bypass valve, disconnect bungee line from top of swivel gland and bypass valve return line at outboard side of swivel gland. Connect jumper between open lines. Disconnect bypass valve return line from bulkhead tee below steering relief valve and connect test stand return hose to line.

(14) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(15) Flush circuit for five minutes.

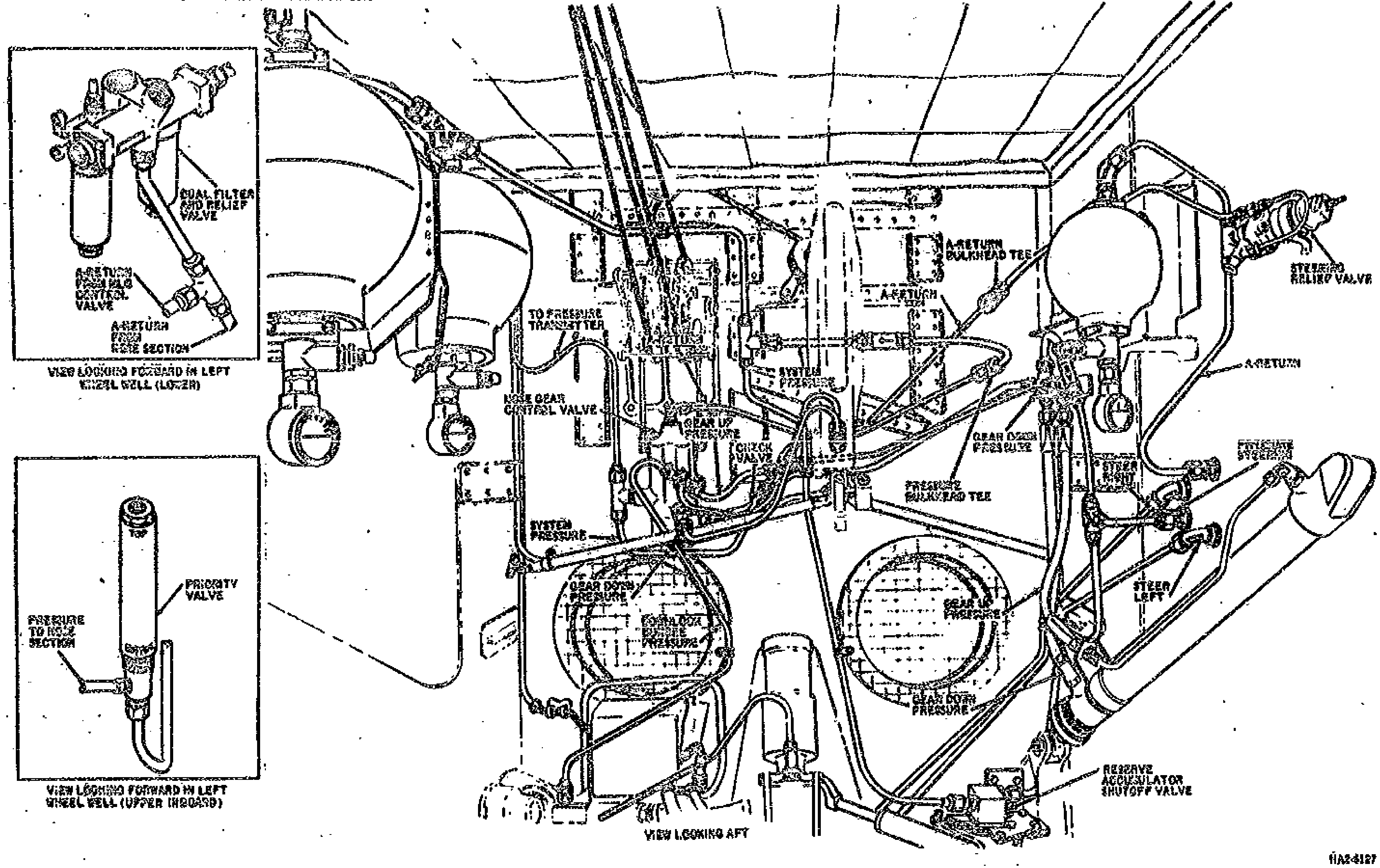
(16) Depressurize test stand.

(17) Inspect, clean, and/or replace relief valve, bleeder valve, return accumulator and two associated lines, nose gear actuating cylinder and attaching hoses, bungee cylinder and attaching line, swivel gland mounted on crossarm, uplatch cylinder and two lines which connect it to control valve.

(18) Inspect, clean, and/or replace nosewheel steering valve, located on outboard side of left side of wheel well and steering bypass valve on airplanes so equipped.

(19) Inspect, clean, and/or replace nosewheel steering cylinders, restrictors, end gland assemblies and associated lines, nosewheel steering control valve, reserve accumulator shutoff valve and associated lines, and check valves.

(20) Restore all lines and units to original configuration, and make any necessary adjustments as described in Chapter 32.




Flushing Procedure Line Connection Locations
Figure 606

G. Wheel Brake System Pressure Lines

(1) Disconnect right gear brake pressure line from brake control valve, and connect test stand pressure hose to this line (see Figure 607).

(2) Disconnect two brake pressure lines from swivel gland at top of main landing gear strut. Connect these lines with a jumper line.

(3) Disconnect brake pressure line from upstream side of tee fitting at dual servo valves.

(4) Disconnect four brake pressure outlet lines from servo valves. Connect jumper line between pressure inlet line and one pressure outlet line. Cap other three outlet lines.

(5) Disconnect inlet and outlet lines and jumper fluid quantity limiter (or lockout cylinder) in outlet line connected in step (4).

(6) Disconnect brake hose from corresponding brake, and connect hose to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

(10) Disconnect jumper line from outlet line connected in step (4), cap outlet line, and connect jumper to one of other three outlet lines.

(11) Repeat steps (5 through 10) to flush remaining servo valve outlet lines.

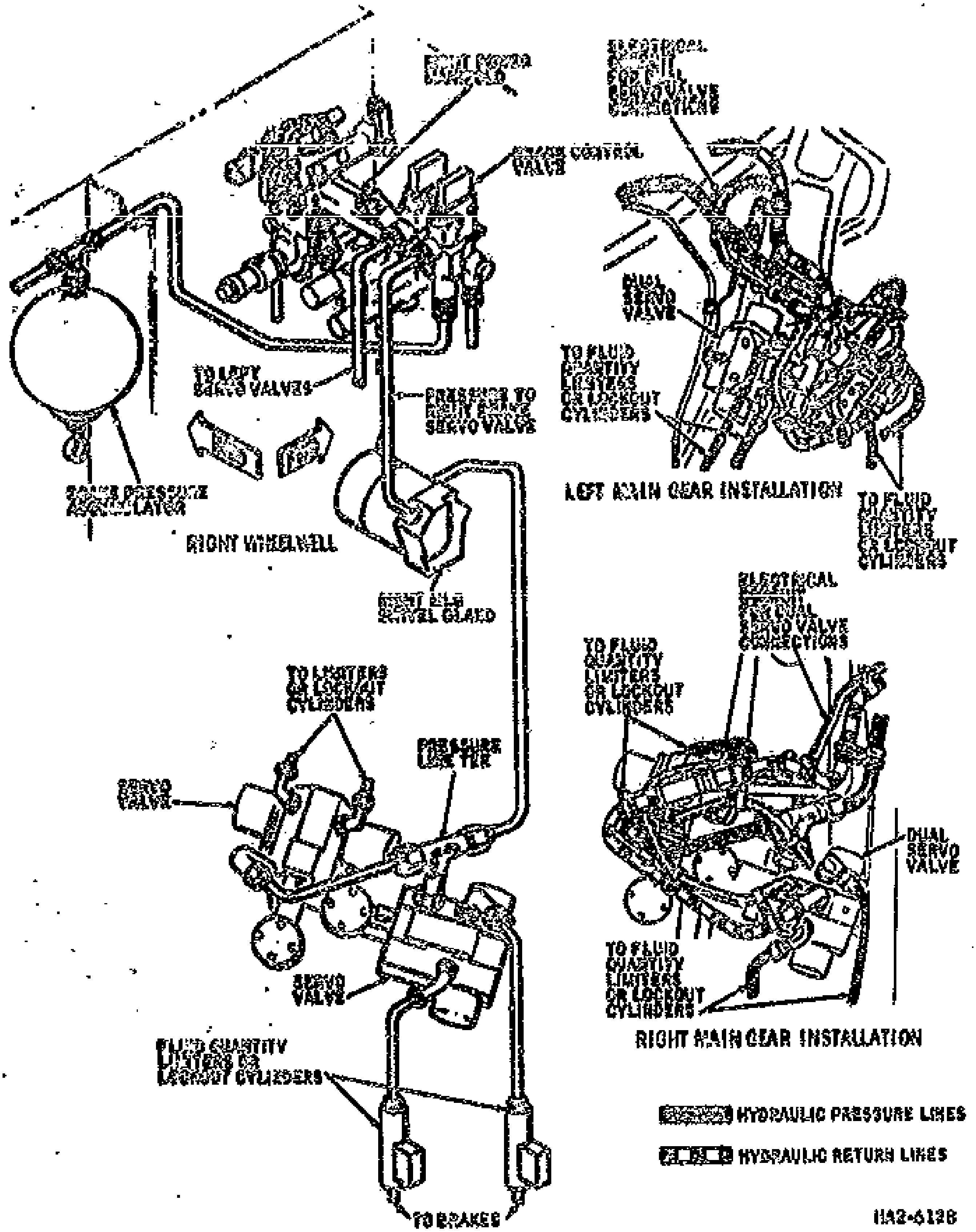
(12) Inspect, clean, and/or replace brake control valve, main landing gear swivel gland, dual servo valves, fluid quantity limiters (or lockout cylinders).

(13) Disconnect test stand pressure hose from right gear brake pressure line at control valve, and connect to left gear brake pressure line at left brake control valve.

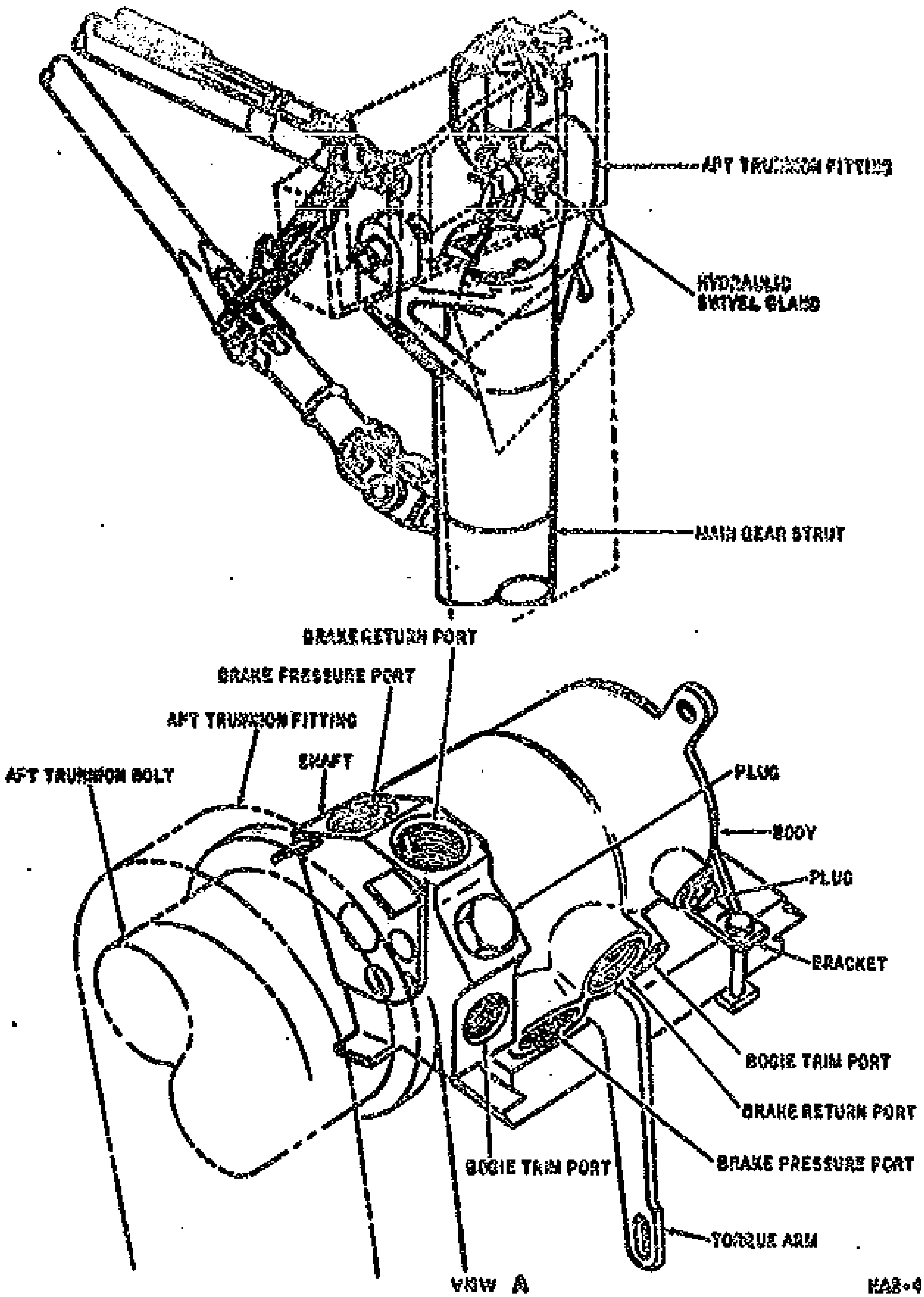
(14) Repeat steps (2 through 12) to flush left brake system pressure lines.

(15) Restore all lines and units to original configuration.

(16) To flush brake accumulators and check valve system, disconnect pressure line which runs from right power manifold to tee on accumulator. Connect test stand return hose to line that was disconnected at accumulator tee.




Flushing Procedure Line Connection Locations
Figure 607 (Sheet 1)




Flushing Procedure Line Connection Locations
Figure 607 (Sheet 2)

(17) Remove brake inlet check valve seat, spring, and poppet from right power manifold. Install seat only with seals.

(18) Remove pressure line from tee at bottom of priority valve, located below left power manifold, and connect this line to test stand pressure hose.

(19) Pressurize test stand to 200 psi at 5 to 20 gpm flow.

(20) Flush circuit for five minutes.

(21) Depressurize test stand.

(22) Remove inlet check valve seat. Examine check valve assembly for evidence of improper seating and magnetization. Install new check valve assembly if required.

(23) Remove accumulators and connecting line. Clean and flush on bench.

(24) Restore all lines and units to original configuration. Bleed and adjust brake system per Chapter 32.

H. Wheel Brake System Return Lines

(1) Disconnect right anti-skid servo valve return line at tee fitting on upper servo valve on right main gear strut. Connect test stand pressure hose to this line.

(2) Disconnect two return lines from swivel gland at top of main gear strut. Connect these lines with jumper line.

(3) Disconnect anti-skid return line from tee fitting in aileron A return line, located in right wing root area (see Figure 607). Cap A-return tee fitting.

(4) Disconnect bogie relief valve at tee and cap line.

(5) Connect test stand return hose to anti-skid line at tee disconnected in step (3).

(6) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Restore all lines and units to original configuration.

(10) Disconnect left anti-skid servo valve return line at tee fitting on upper servo valve on left main gear strut. Connect test stand pressure hose to this line.

(11) Disconnect two return lines from swivel gland at top of main gear strut. Connect those lines with jumper line.

(12) Disconnect left bogie relief valve from anti-skid return line at tee fitting. Cap line and tee.

(13) Disconnect left anti-skid return line from cross fitting in case drain return port of main reservoir. Cap cross fitting.

(14) Connect test stand return hose to this line.

(15) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(16) Flush circuit for five minutes.

(17) Depressurize test stand.

(18) Restore all lines and units to original configuration.

UTILITY SYSTEMS UPSTREAM OF CONTROL SYSTEM FILTERS - INSPECTION/CHECK

1. General

A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the utility systems upstream of the control system filters by flushing the systems with clean hydraulic fluid.

B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

D. Before any flushing procedures are performed, personnel should read and thoroughly understand 29-00, Inspection/Check.

2. Tools and Equipment Required

A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Utility Systems Upstream of Control System Filters

A. Wing Flap System

(1) Disconnect flap up and flap down lines from wing flap control valve (see Figure 601).

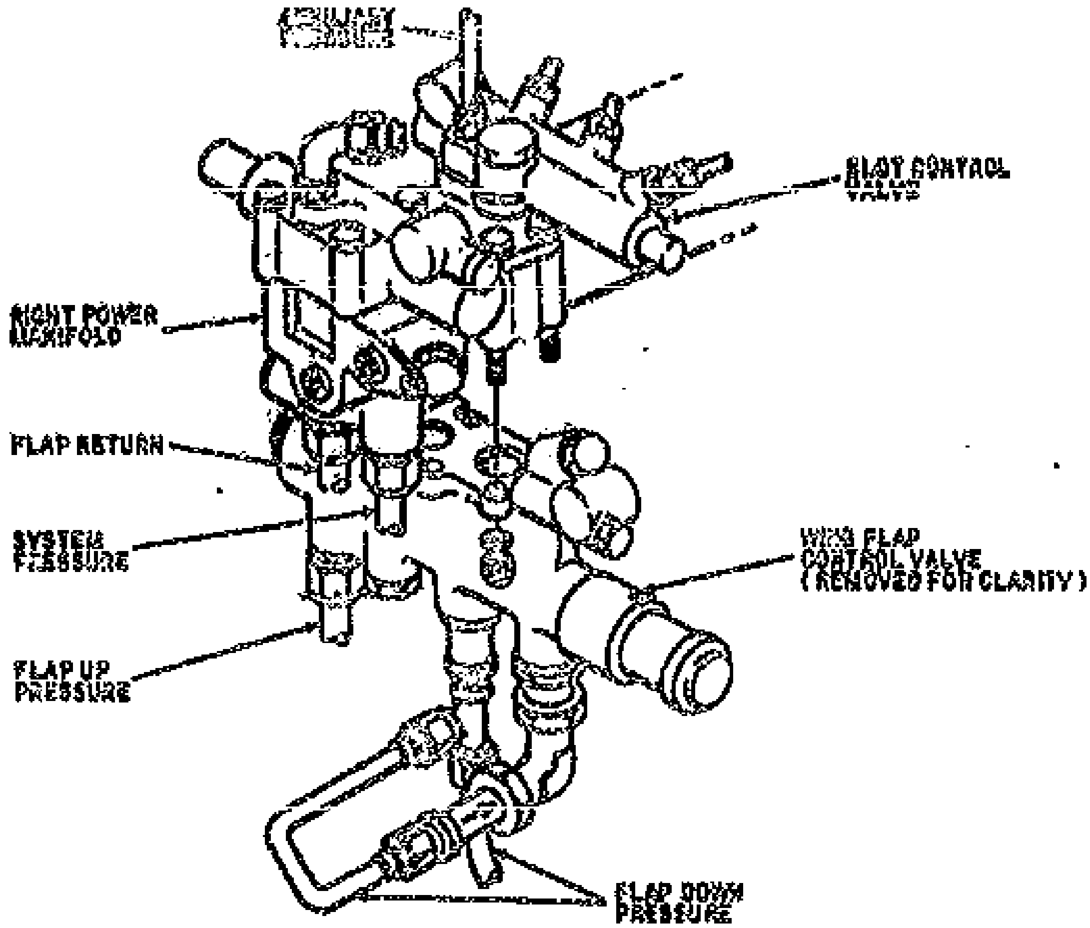
(2) Remove restrictor with portion of wing flap up line, which is connected to wing flap control valve.

(3) Disconnect flap return line from right power manifold just inboard of flap control valve. Jumper this line to flap down line, which was disconnected in Step (1).

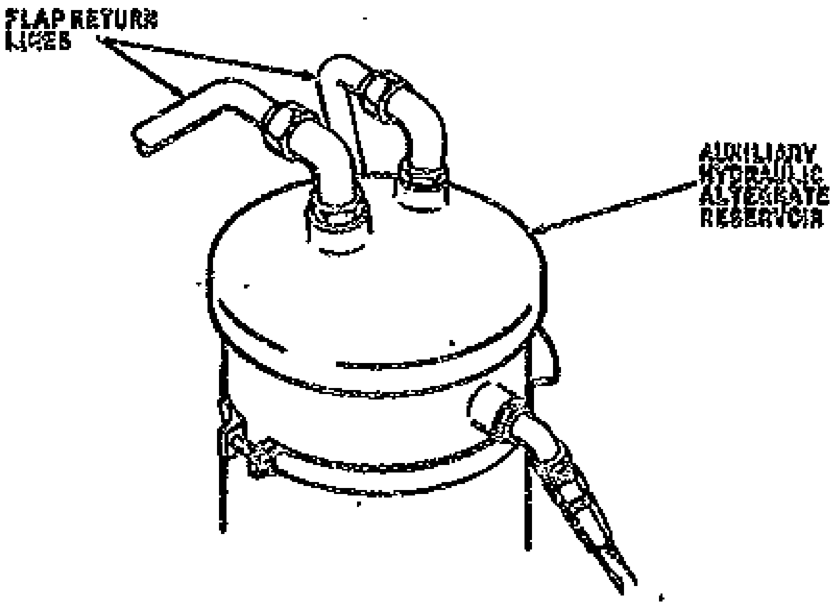
(4) Connect open flap up line to test stand pressure hose.

(5) Disconnect flap return line from inlet port of auxiliary pump alternate reservoir. Connect this line to test stand return hose.

(6) Remove thermal relief valve from tee in flap up line, located at STA $X_{rs}$ = 70 in right wing root. Cap tee.

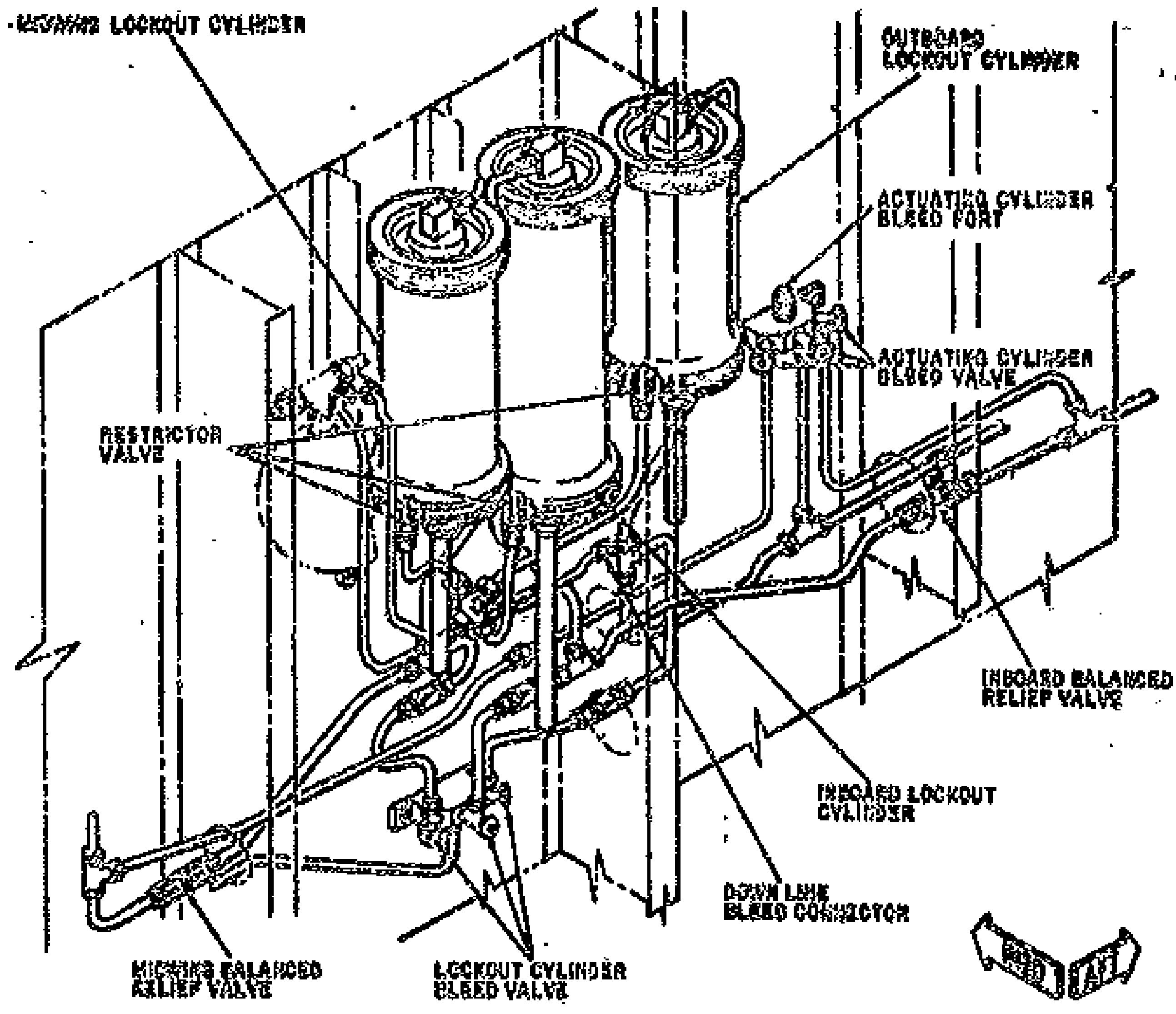



RIGHT POWER MANIFOLD




ALTERNATE RESERVOIR

Flushing Procedure Line Connection Locations
Figure 601




LEFT MAIN LANDING
GEAR WHEEL WELL

HA8-7556

Flushing Procedures -- Line Connection Location
Figure 601A

(7) Disconnect hoses from outboard flap actuating cylinders. Plug all hoses.

(8) At inboard and midwing flap actuating cylinders, disconnect flap up and flap down pressure lines and install jumper between both set of lines.

(9) Disconnect bottom line from flap lockout cylinder bleed valve manifold (see Figure 601A).

(10) Remove lines and check valves (3) from top of bleed valve manifold.

(11) Connect jumper between line disconnected in step (9) and tee fitting below inboard lockout cylinder from which check valve was removed in step (10).

(12) Disconnect lines (3) from bottom of actuating cylinder bleed valve manifold.

(13) Connect jumper between bleed line for inboard actuating cylinder and down line bleed connector.

(14) Disconnect lines from top and bottom of inboard flap lockout cylinder and connect jumper between lines.

(15) At inboard and midwing balanced relief valve, disconnect and jumper lines.

(16) Pressurize test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(17) Shut off pressure source.

(18) Disconnect jumper from tee fitting below inboard lockout cylinder and connect to line below midwing lockout cylinder from which check valve was removed in step (10).

(19) Disconnect jumper from bleed line for inboard actuating cylinder and connect to bleed line for midwing actuating cylinder.

(20) Pressurize test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(21) Disconnect lines from top and bottom of inboard flap lockout cylinder and connect jumper between lines.

(22) Disconnect jumper from line below midwing lockout cylinder and connect to line below outboard lockout cylinder from which check valve was removed in step (10).

(23) Disconnect jumper from bleed line for midwing actuating cylinder and connect to bleed line for outboard actuating cylinder.

(24) At midwing flap actuating cylinders, remove jumpers. Plug flap down pressure lines.

(25) Connect jumper between midwing actuating cylinder up pressure line and outboard actuating cylinder down pressure lines.

(26) Pressurize test stand to 200 psi maximum at 20 gpm flow and flush circuit for five minutes.

(27) Shut off pressure source.

(28) Disconnect test stand pressure hose from flap up line. Connect line to wing flap control valve.

(29) Disconnect auxiliary pump case drain line from inlet port on side of alternate reservoir and from case drain of auxiliary pump.

(30) Connect test stand pressure hose and return hose to drain line, flush for three minutes.

(31) Disconnect auxiliary pump suction line at alternate reservoir and auxiliary pump selector valve.

(32) Disconnect test stand pressure hose and test stand return hose from auxiliary pump case drain line, and connect to auxiliary pump suction line, flush for three minutes.

(33) Remove jumpers at all flap actuating cylinders, flap lockout cylinders, flap control valve, and actuating cylinder bleed valve manifold. Connect airplane lines to applicable component.

(34) Bench flush short lines that run between lockout cylinder bleed valve manifold and check valve (removed in step 10).

(35) Install lines and check valves on lockout cylinder bleed valve manifold.

(36) Remove and bench flush short line that runs between thermal relief valve and tee in low-pressure return line.

<u>NOTE</u>: Steps (37) through (47) have been deleted.

(48) Inspect, clean, and/or replace all flap actuator cylinders, lockout cylinders thermal relief valve, balanced relief valves, restrictor valve, and flap control valve.

(49) Restore all lines and units to original configuration.

(50) Adjust rigging if necessary (see Chapter 27).

B. Wing Slot System

(1) Disconnect slots open and slots closed lines from wing slot control valve, located on right power manifold (see Figure 601).

(2) Connect slots open line to test stand pressure hose. Connect slots closed line to test stand return hose.

(3) Disconnect lines from 4 slot cylinders, cap all lines except outboard right cylinder lines. Install jumper across these two lines.

(4) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(5) Flush circuit for three minutes.

(6) Depressurize test stand.

(7) Move jumper to right inboard slot cylinder lines, cap outboard lines, and repeat Steps (4 through 6).

(8) Repeat Steps (3 through 7) for left side. Make certain that all lines on both sides of airplane, with exception of jumpered lines, are capped.

(9) Inspect, clean, and/or replace wing slot cylinders and wing slot control valve, located on right power manifold.

(10) Restore all lines and units to original configuration. Adjust rigging if necessary per Chapter 27.

C. Main Gear Retract System (See Figures 602 and 603.)

(1) Disconnect gear up pressure line, gear down pressure line, and gear down return lines from main gear control valve.

(2) Connect jumper between gear down pressure line and gear down A-return line.

(3) Connect gear up line to test stand pressure hose.

(4) Disconnect gear down A-return line from tee in (nose gear return) A-return line, located in left wheel well aft of rear spar and below dual filter and relief valve. Connect line to test stand return hose.

(5) Disconnect right gear up and gear down lines from tees, located to right of centerline of airplane. Cap tees. Left gear retract system will be flushed first.

(6) In left wheel well, disconnect both main gear uplatch lines from tees in gear up and gear down lines. Cap tees.

(7) Disconnect both main gear door latch lines from tees in gear up and gear down lines near wing root. Cap tees.

(8) Disconnect downlock bungee pressure line from tee in gear up line. Cap tee.

(9) Disconnect line, which leads to bungee cylinder, from tee in gear down line. Cap tee.

(10) Disconnect line, which leads to gear door manual open valve, from tee in main gear down line. Cap tee.

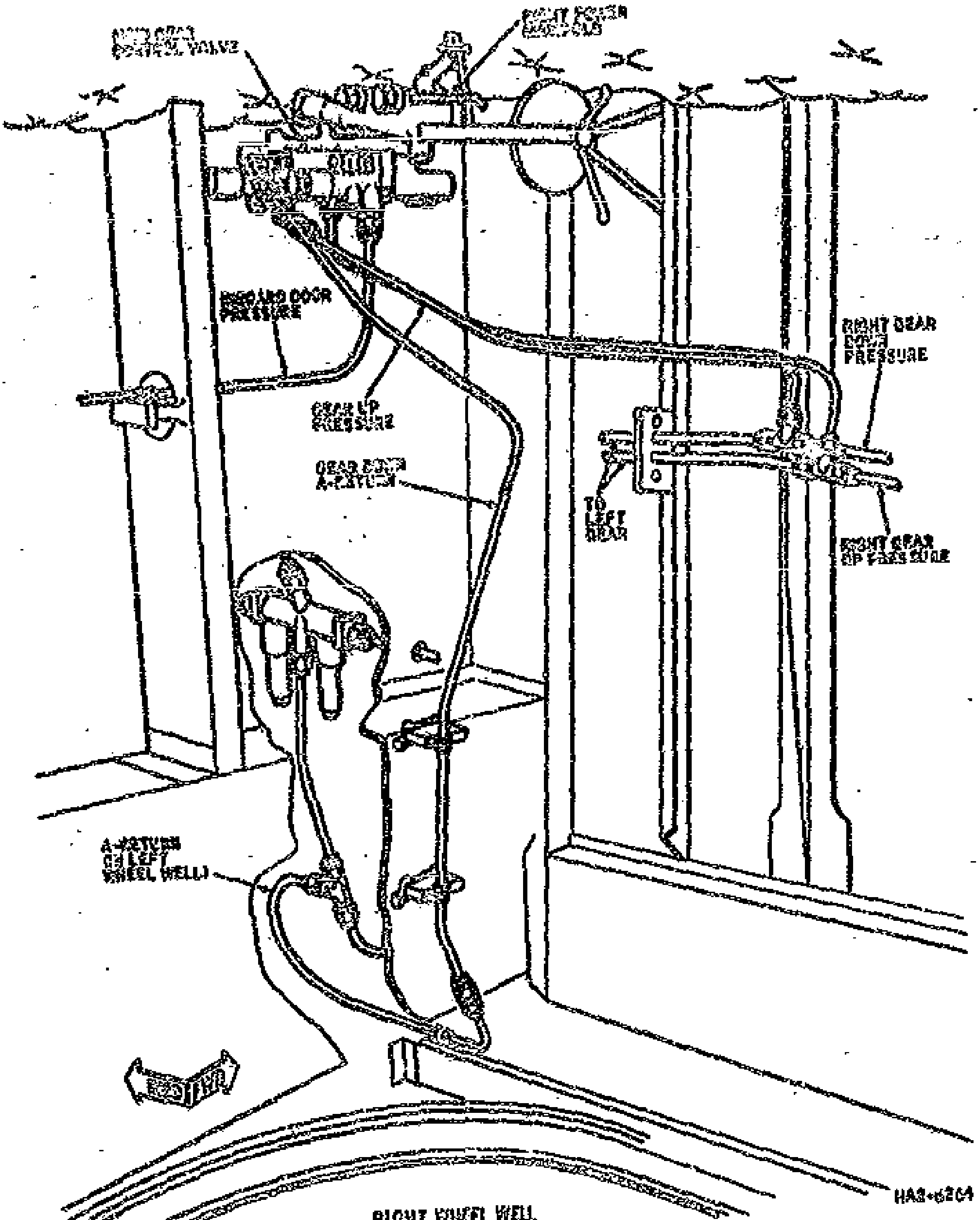
(11) Replace restrictor in gear down line with jumper.

(12) Disconnect gear up and gear down lines from upstream side of actuating cylinder swivel gland. Connect jumper between these lines.

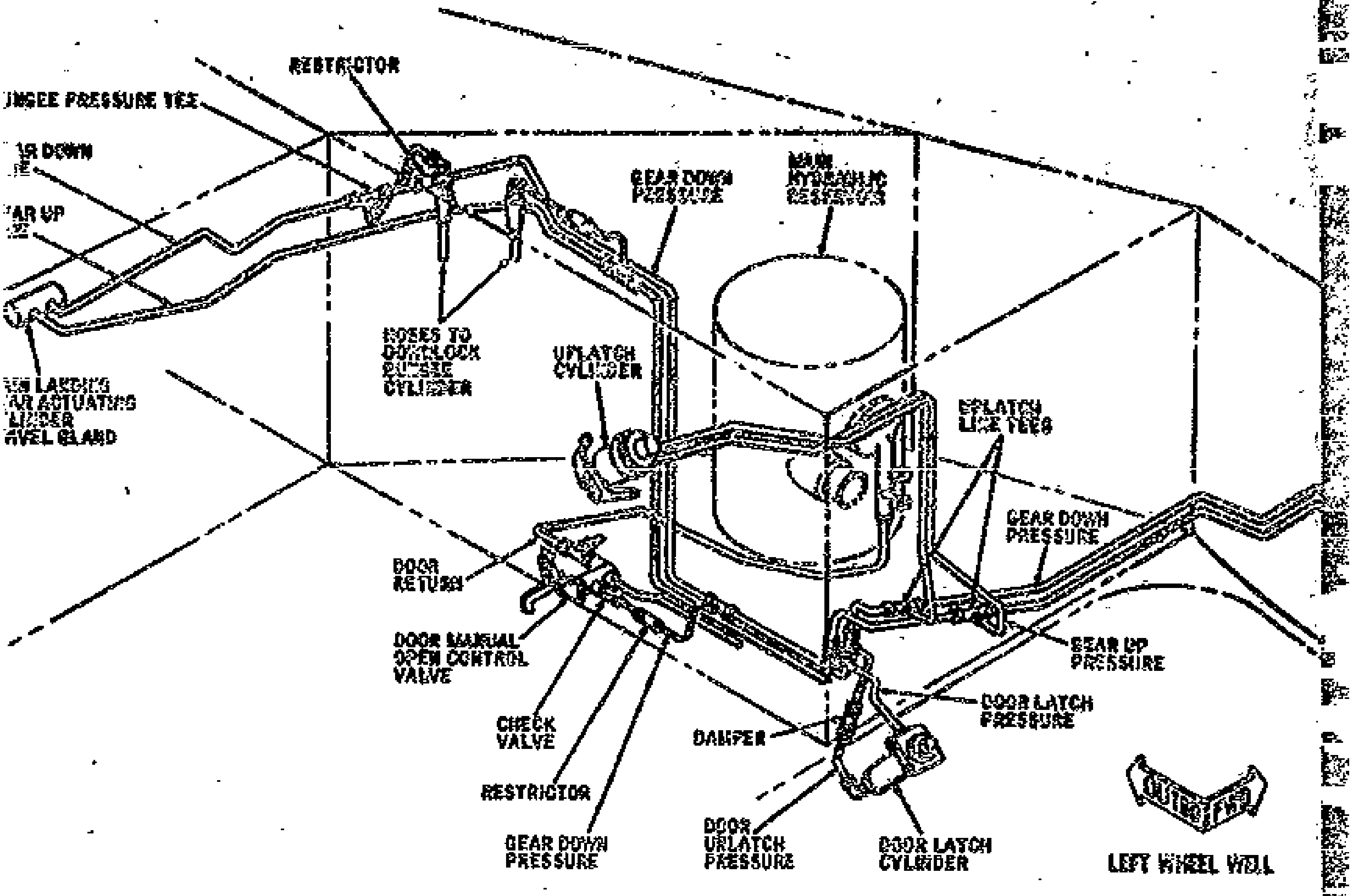
(13) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(14) Flush circuit for five minutes.

(15) Depressurize test stand.




Flushing Procedure Line Connection Locations
Figure 602




Flushing Procedure Line Connection Locations
Figure 603

(16) Inspect, clean, and/or replace actuating cylinder and attaching swivel gland, door latch assembly and attaching lines (which include damper), Overlock bungee cylinder and connecting lines including 2 hoses, restrictors and several short lines.

(17) Disconnect gear uplatch lines from gear uplatch cylinder and connect jumper between lines.

(18) Connect this circuit to test stand pressure and return hoses and flush for 3 minutes. Use same pressure as in Step (13).

(19) Inspect, clean, and/or replace main gear uplatch cylinder.

(20) Restore all lines and units on left side of airplane to original configuration.

(21) Connect test stand pressure hose to right gear down line, and test stand return hose to right gear up line. These lines were capped in Step (5).

(22) Repeat Steps (6 through 20) for right side of airplane.

(23) Make any necessary adjustments per Chapter 32.

D. Main Gear Door System

(1) Disconnect right main gear door lines from bulkhead tees in center web of airplane. Cap tees.

(2) Disconnect pressure and return lines from left door actuating cylinder swivel gland. Place jumper across these lines.

(3) Disconnect door return line from inboard side of door manual open valve. Connect line to test stand return hose.

(4) Disconnect door pressure line from main gear control valve. Connect line to test stand pressure hose.

(5) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(6) Flush circuit for three minutes.

(7) Depressurize test stand.

(8) Disconnect pressure and return lines from right door actuating cylinder swivel gland. Connect jumper across these lines.

(9) Connect test stand pressure and return hoses to lines that were capped in Step (1).

(10) Repeat Steps (5 through 7) for these lines.

(11) Inspect, clean, and/or replace both door actuating units, lines, and swivel glands.

(12) Inspect, clean, and/or replace door manual open valve, short line between manual open valve and tee in down line (this line includes restrictor and check valve) and line which runs from tee in manual open valve to reservoir fitting.

(13) Restore all lines and units to original configuration, and make any necessary adjustments per Chapter 32.

E. Bogie Trim System (See Figure 604)

(1) Disconnect bogie trim pressure line from cross fitting below priority valve.

(2) Connect test stand pressure hose to bogie trim pressure line.

(3) Disconnect bogie trim pressure line, which leads to right gear, at tee located below left power manifold and to left of airplane centerline. Cap tee.

(4) Disconnect bogie trim cylinder pressure hose at forward manifold on left main gear strut.

(5) Connect test stand return hose to manifold port.

(6) Install jumper lines around main gear swivel gland in bogie trim pressure line.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

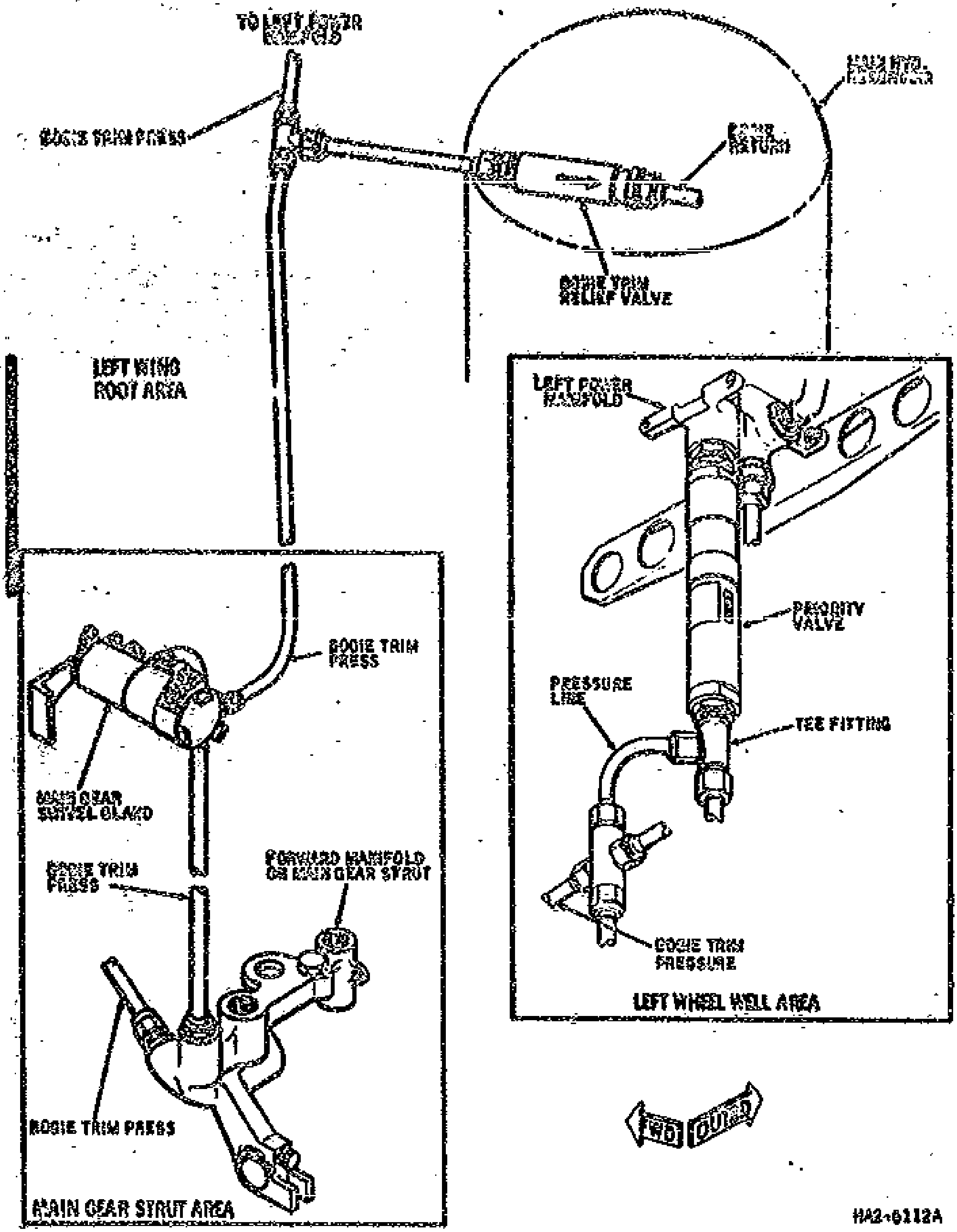
(10) Inspect, clean, and/or replace bogie trim relief valve, swivel gland, located at top of main gear strut, and bogie trim cylinder with attaching hoses, short lines between tee in bogie trim pressure line and relief valve, between relief valve and manual door open valve on left side of airplane, and between relief valve and antiskid valve.

(11) Connect right bogie trim pressure line to tee from which it was disconnected in Step (3). Disconnect left bogie trim pressure line from this tee, and cap tee.

(12) Disconnect test stand return hose from left forward manifold and connect it to bogie trim port on right main rear forward manifold.

(13) Repeat Steps (5 through 10) for right side of airplane.

(14) Restore all bogie trim lines, hoses, and units to original configuration.




HA2-6112A

Flushing Procedure Line Connection Locations
Figure 604

F. Nose Gear System (See Figures 605 and 606.)

(1) Disconnect nose gear down line from tee just inboard of nose gear control valve. Connect line to test stand pressure hose.

(2) Disconnect actuating cylinder gear down hose from tee in gear down line, located on left side of nosewheel well. Cap tee.

(3) Jumper check valve in steering pressure line, which runs from tee for actuating cylinder down hose to tee which branches to reserve accumulator shutoff valve and pressure line running forward.

(4) At tee between check valve, removed in Step (3), and reserve accumulator shutoff valve, disconnect steering pressure line which leads forward. Cap tee.

(5) Disconnect pressure line from left side of reserve accumulator shutoff valve. Place jumper between this line and line which was disconnected in Step (4).

(6) Replace check valve in steering pressure line, located aft of nosewheel steering valve, with jumper.

(7) Disconnect all four lines from steering control valve. Connect jumpers between pressure line and steer right line, and between return line and steer left line.

(8) On airplanes without nose gear steering bypass valve, perform Steps (a) through (c).

(a) Disconnect five steering lines from swivel gland and tee located on cross arm. Connect jumper across two open steer left lines located on opposite sides of swivel gland. Connect jumper across two steer right lines which were disconnected from same tee in swivel gland.

(b) Disconnect at steering cylinder glands, three steering lines which run from swivel gland on crossarm to glands at steering cylinders.

(c) Install jumper across two lines on right cylinder. On left cylinder, install jumper from open line to open steer-right line upstream of swivel gland on crossarm.

(9) On airplanes equipped with nose gear steering bypass valve, perform Steps (a) through (h).

(a) Disconnect four steering lines from swivel gland located on crossarm. Connect jumper across two open steer left lines. Connect jumper across two open steer right lines.

(b) At steering relief valve, disconnect six steering lines.

(c) Connect jumper between steer left inlet line and one of steering lines to right steering cylinder.

(d) Connect jumper between steer right inlet line and one of steering lines to left steering cylinder.

(e) Jumper remaining left cylinder line to remaining right cylinder line.

(f) Disconnect and jumper two lines at right steering cylinder swivel glands.

(g) Disconnect and jumper two lines at left steering cylinder swivel glands.

(h) Disconnect and remove for cleaning, short bypass valve return line between crossarm swivel gland and bypass valve.

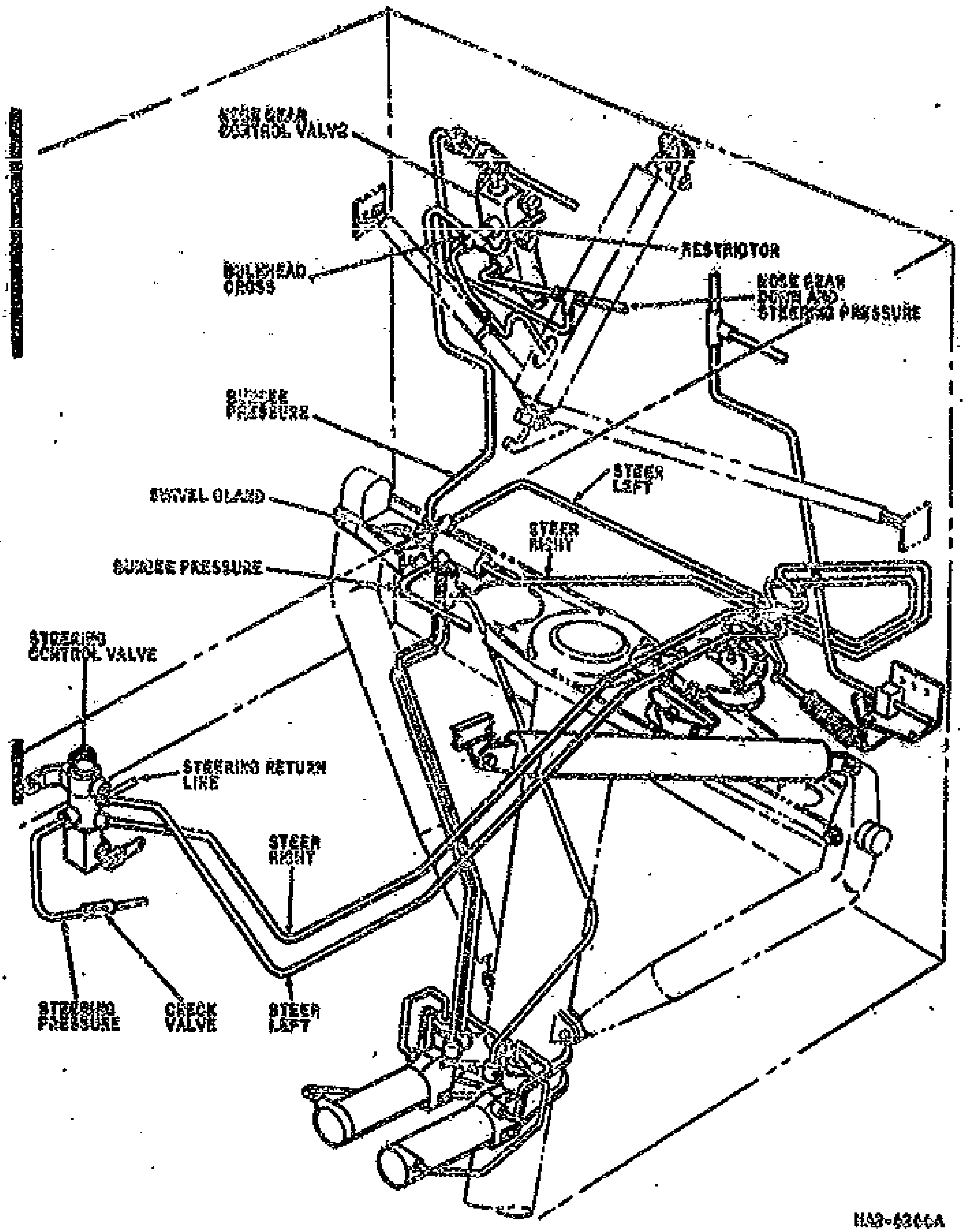
(10) Disconnect steering return line from lower side of tee in steering relief valve. Disconnect gear actuating cylinder up hose at cylinder. Connect jumper between this open line and hose.

(11) Disconnect 1/4-inch up line from restrictor on side away from control valve. Disconnect 1/4-inch bungee line at bulkhead cross fitting at control valve. Connect jumper across these two open lines.

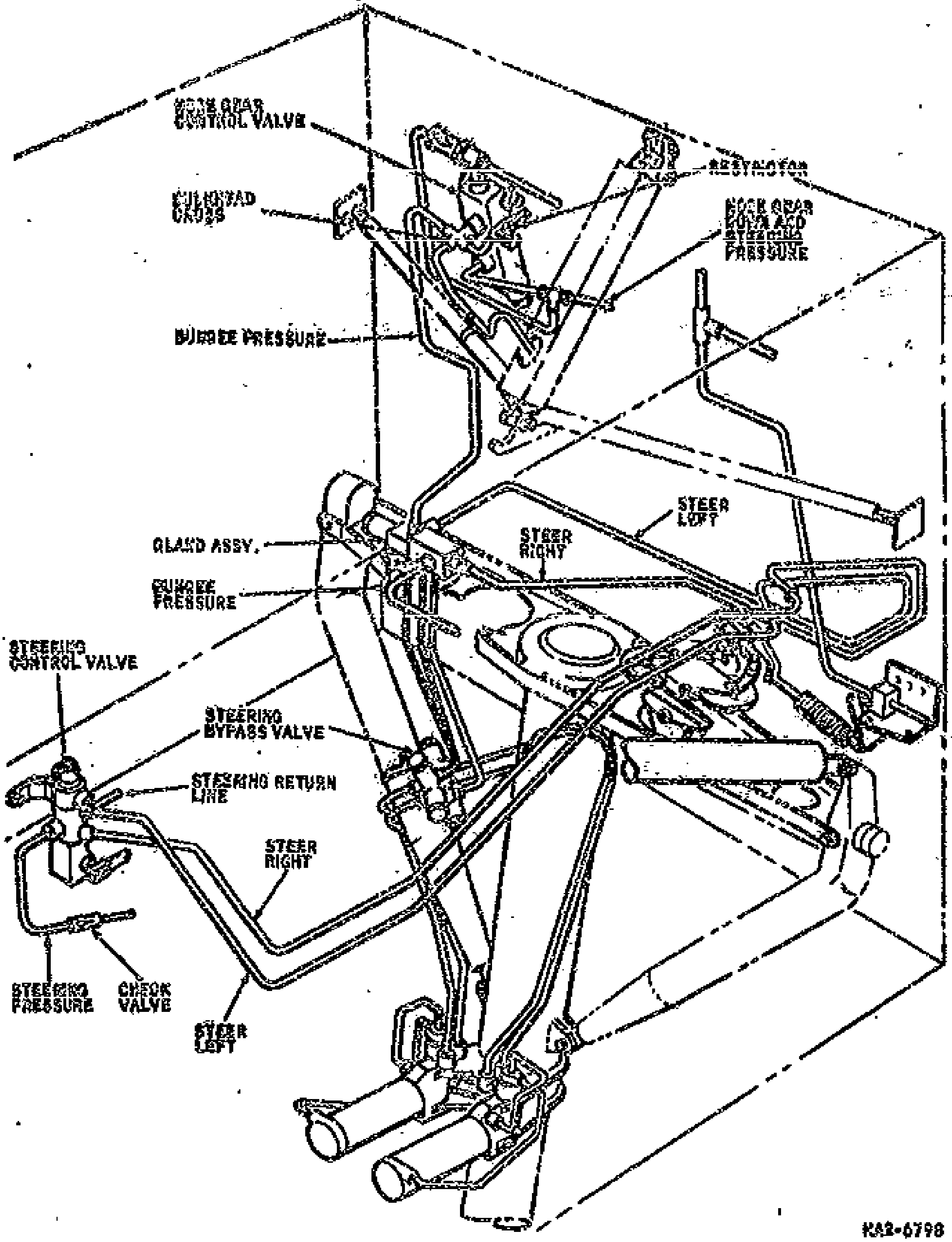
(12) On airplanes without nose gear steering bypass valve, disconnect bungee line from top of swivel gland and connect to test stand return hose.

(13) On airplanes equipped with nose gear steering bypass valve, disconnect bungee line from top of swivel gland and bypass valve return line at outboard side of swivel gland. Connect jumper between open lines. Disconnect bypass valve return line from bulkhead tee below steering relief valve and connect test stand return hose to line.

(14) Pressurize test stand to 200 psi maximum at 20 gpm flow.




Flushing Procedure Line Connection Locations
(Airplanes Without Steering Bypass Valve)
Figure 605




Flushing Procedure Line Connection Locations
(Airplanes With Steering Bypass Valve)
Figure 605A

(15) Flush circuit for five minutes.

(16) Depressurize test stand.

(17) Inspect, clean, and/or replace relief valve, bleeder valve, return accumulator and two associated lines, nose gear actuating cylinder and attaching hoses, bungee cylinder and attaching line, swivel gland mounted on crossarm, uplatch cylinder and two lines which connect it to control valve.

(18) Inspect, clean, and/or replace nosewheel steering valve, located on outboard side of left side of wheel well and steering bypass valve on airplanes so equipped.

(19) Inspect, clean, and/or replace nosewheel steering cylinders, restrictors, and gland assemblies and associated lines; nosewheel steering control valve, reserve accumulator shutoff valve and associated lines, and check valves.

(20) Restore all lines and units to original configuration, and make any necessary adjustments as described in Chapter 32.

G. Wheel Brake System Pressure Lines

(1) Disconnect right gear brake pressure line from brake control valve, and connect test stand pressure hose to this line (see Figure 607).

(2) Disconnect two brake pressure lines from swivel gland at top of main landing gear strut. Connect these lines with a jumper line.

(3) Disconnect brake pressure line from upstream side of tee fitting at dual servo valves.

(4) Disconnect four brake pressure outlet lines from servo valves. Connect jumper line between pressure inlet line and one pressure outlet line. Cap other three outlet lines.

(5) Disconnect inlet and outlet lines and jumper fluid quantity limiter (or lockout cylinder) in outlet line connected in Step (4).

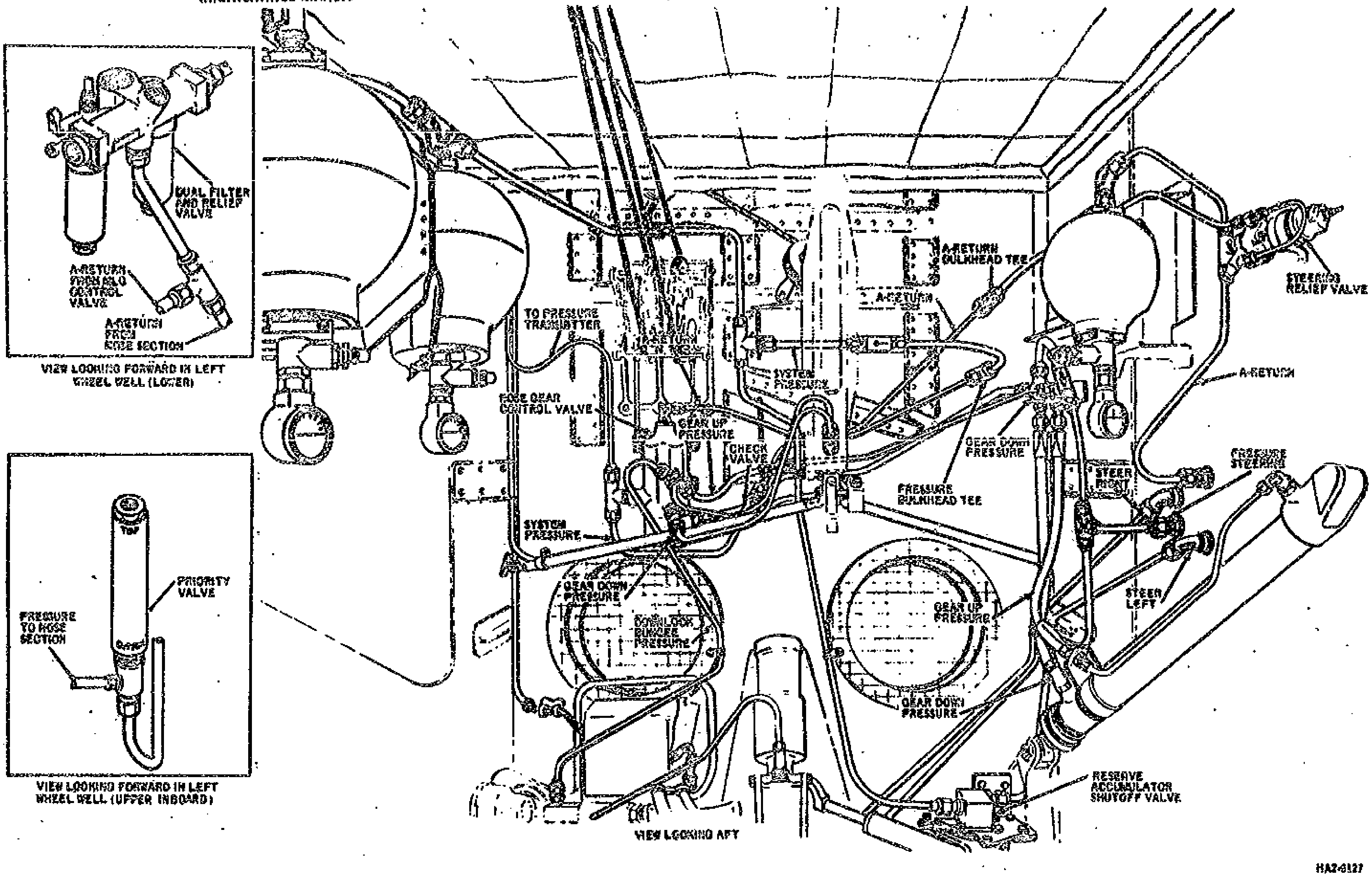
(6) Disconnect brake hose from corresponding brake, and connect hose to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

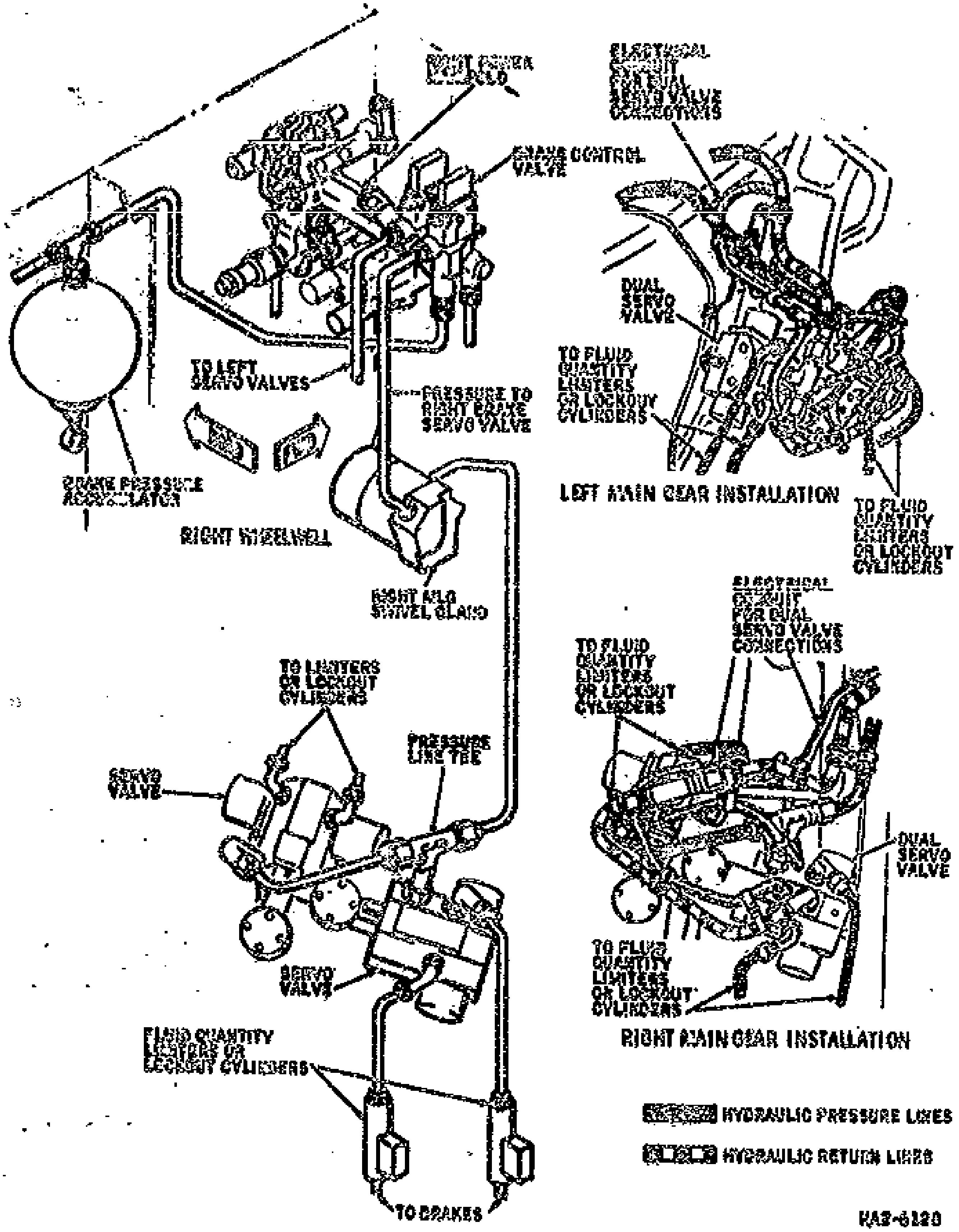
(8) Flush circuit for five minutes.

(9) Depressurize test stand.

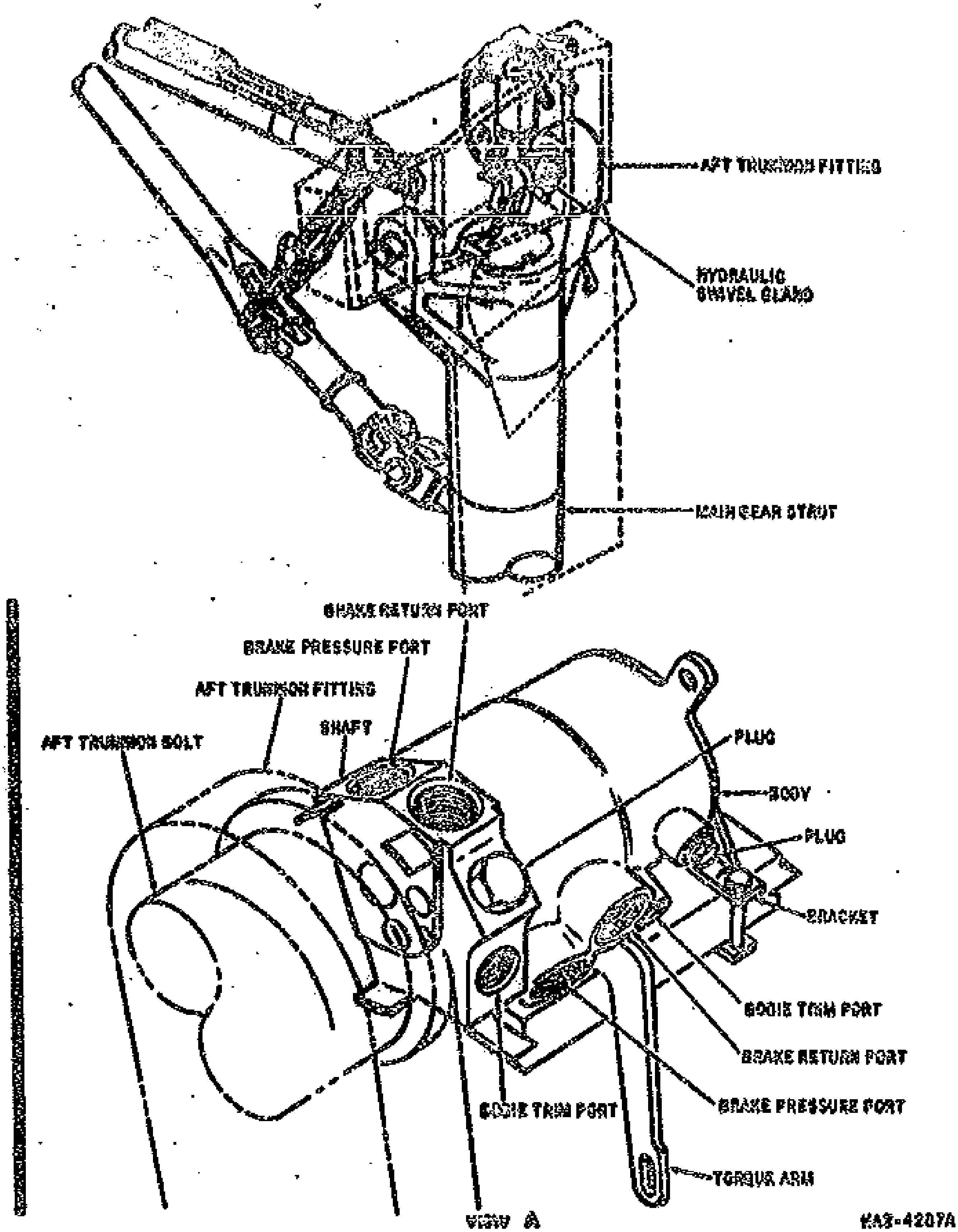
(10) Disconnect jumper line from outlet line connected in Step (4), cap outlet line, and connect jumper to one of other three outlet lines.



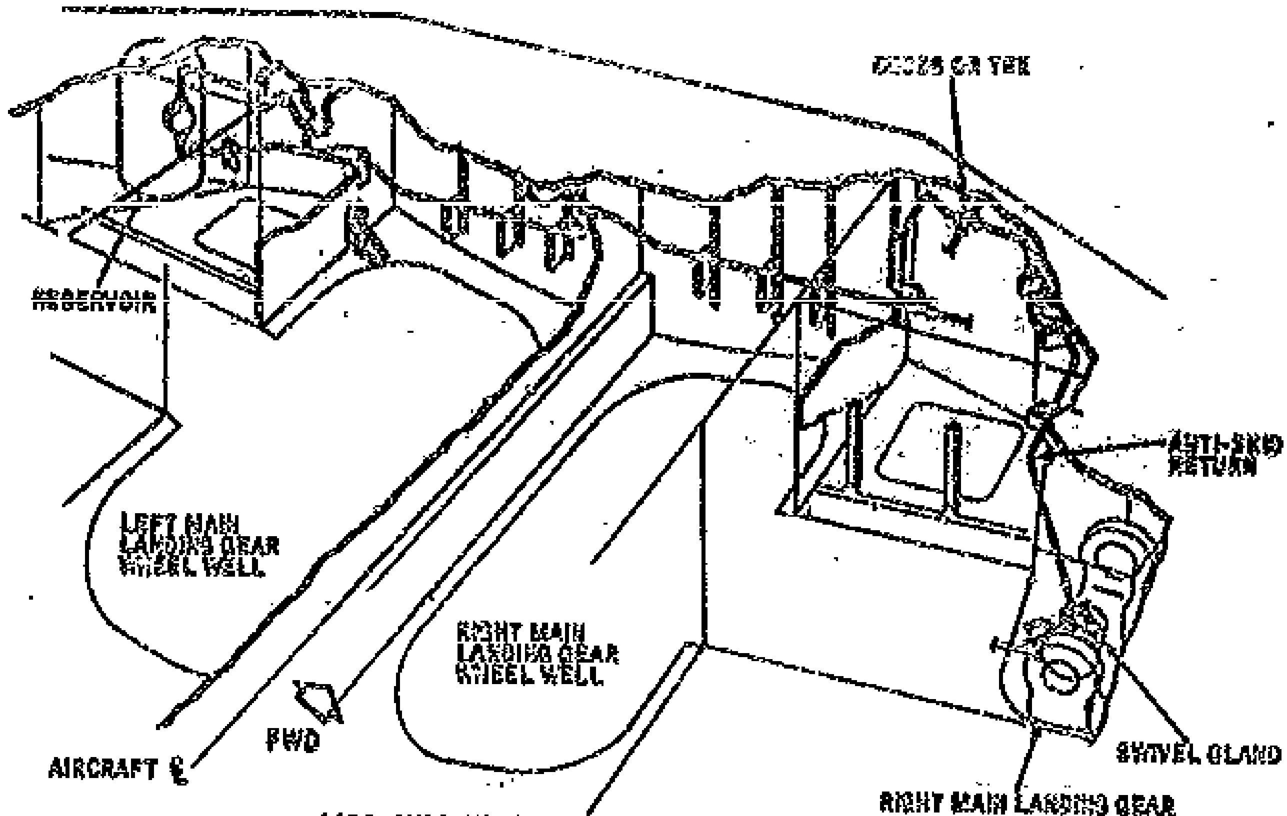

Flushing Procedure Line Connection Locations
Figure 606



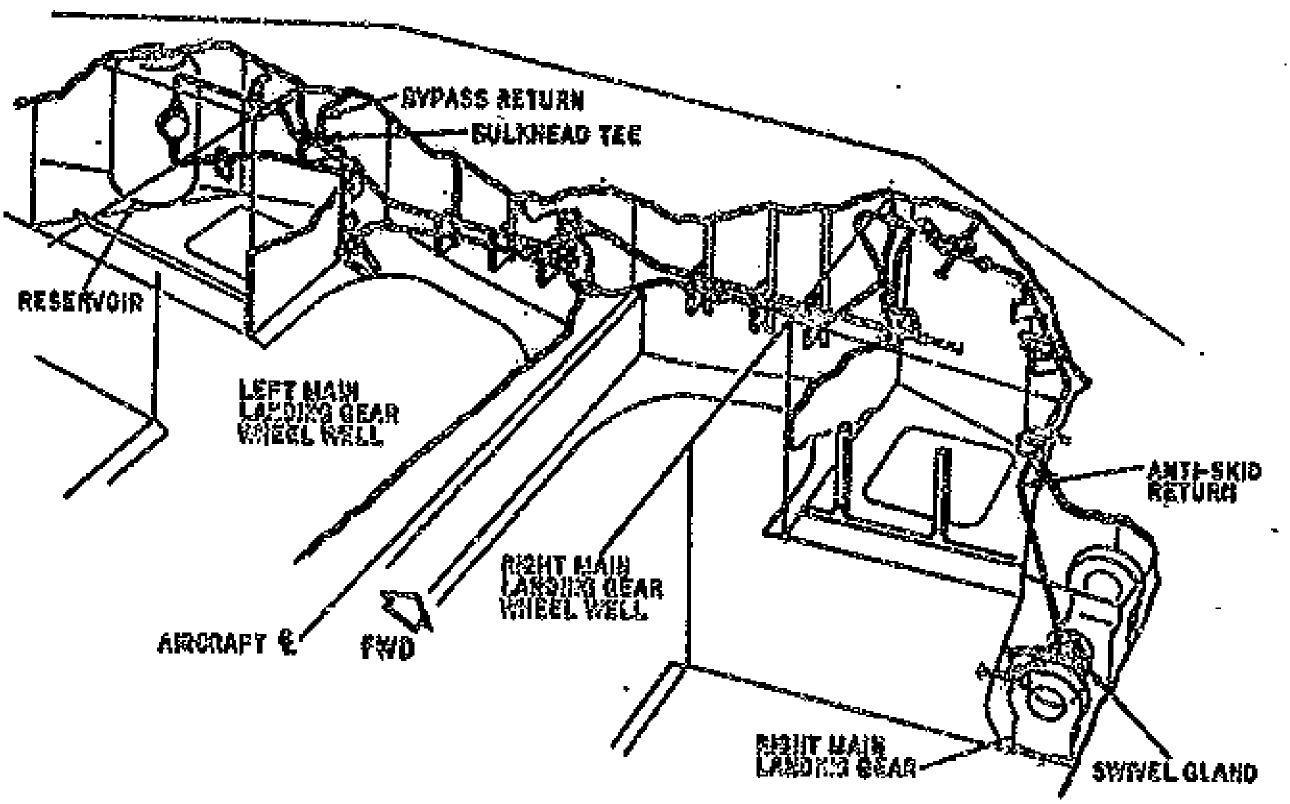

Flushing Procedure Line Connection Locations
Figure 607 (Sheet 1)




Flushing Procedure Line Connection Locations
Figure 607 (Sheet 2)




AIRPLANES WITHOUT DIRECT RETURN LINE




AIRPLANES WITH DIRECT RETURN LINE

HA2-6502

Flushing Procedure Line Connection Locations
Figure 607 (Sheet 3)

(11) Repeat Steps (5 through 10) to flush remaining servo valve outlet lines.

(12) Inspect, clean and/or replace brake control valve, main landing gear swivel gland, dual servo valves, fluid quantity limiters (or lockout cylinders).

(13) Disconnect test stand pressure hose from right gear brake pressure line at control valve, and connect to left gear brake pressure line at left brake control valve.

(14) Repeat Steps (2 through 12) to flush left brake system pressure lines.

(15) Restore all lines and units to original configuration.

(16) To flush brake accumulators and check valve system, disconnect pressure line which runs from right power manifold to tee on accumulator. Connect test stand return hose to line that was disconnected at accumulator tee.

(17) Remove brake inlet check valve seat, spring, and poppet from right power manifold. Install seat only with seals.

(18) Remove pressure line from tee at bottom of priority valve, located below left power manifold, and connect this line to test stand pressure hose.

(19) Pressurize test stand to 200 psi at 5 to 20 gpm flow.

(20) Flush circuit for five minutes.

(21) Depressurize test stand.

(22) Remove inlet check valve seat. Examine check valve assembly for evidence of improper seating and magnetization. Install new check valve assembly if required.

(23) Remove accumulators and connecting line. Clean and flush on bench.

(24) Restore all lines and units to original configuration. Bleed and adjust brake system per Chapter 32.

H. Wheel Brake System Return Lines

(1) Disconnect right anti-skid servo valve return line at tee fitting on upper servo valve on right main gear strut. Connect test stand pressure hose to this line.

(2) Disconnect two return lines from swivel gland at top of main gear strut. Connect these lines with jumper line.

(3) On airplanes not equipped with right brake anti-skid direct return line, disconnect anti-skid return line from tee fitting in aileron A return line, located in right wing root area (see Figure 607). Cap A-return tee fitting. Disconnect bogie relief valve at tee and cap line.

(4) On airplanes equipped with right brake anti-skid direct return line, disconnect right brake anti-skid return line from bulkhead tee in bypass return line on outboard bulkhead of left wheel well.

(5) Connect test stand return hose to anti-skid line at tee disconnected in Step (3) or (4) as applicable.

(6) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Restore all lines and units to original configuration.

(10) Disconnect left anti-skid servo valve return line at tee fitting on upper servo valve on left main gear strut. Connect test stand pressure hose to this line.

(11) Disconnect two return lines from swivel gland at top of main gear strut. Connect these lines with jumper line.

(12) Disconnect left bogie relief valve from anti-skid return line at tee fitting. Cap line and tee.

(13) Disconnect left anti-skid return line from tee fitting in B-return port of main reservoir. Cap tee fitting.

(14) Connect test stand return hose to this line.

(15) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(16) Flush circuit for five minutes.

(17) Depressurize test stand.

(18) Restore all lines and units to original configuration.

## FLIGHT POWER CONTROL SYSTEMS - INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the flight power control systems by flushing the systems with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand Section 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Flight Power Control Systems

   A. Aileron Power System

      (1) On left side of airplane, remove, inspect, clean and/or replace aileron power valve, power cylinder, lockout tab cylinder, and associated piping (including lines, glands, and restrictors) downstream of aileron filter and outboard of return manifold located at STA $X_{rs}$ = -500.

      (2) Repeat Step (1) for right aileron power system.

   B. Rudder Power System (See Figures 601 and 602.)

      (1) In tail of airplane aft of pressure bulkhead, disconnect three horizontal stabilizer trim lines from tees in three rudder lines. Cap tees.

      (2) On aft side of pressure bulkhead, disconnect B-return and low-pressure return lines. On downstream side of filter, disconnect empennage pressure line and connect it to test stand pressure hose.

(3) Connect jumper across open B-return and low-pressure return lines.

(4) Where rudder standby pressure line tees into normal pressure line, remove line and check valve. Cap tee.

(5) In same tee, mentioned in Step (4), remove other check valve in normal pressure line and replace with jumper.

(6) Disconnect line which runs from check valve in shutoff valve to tee in B-return line at tee. Cap tee.

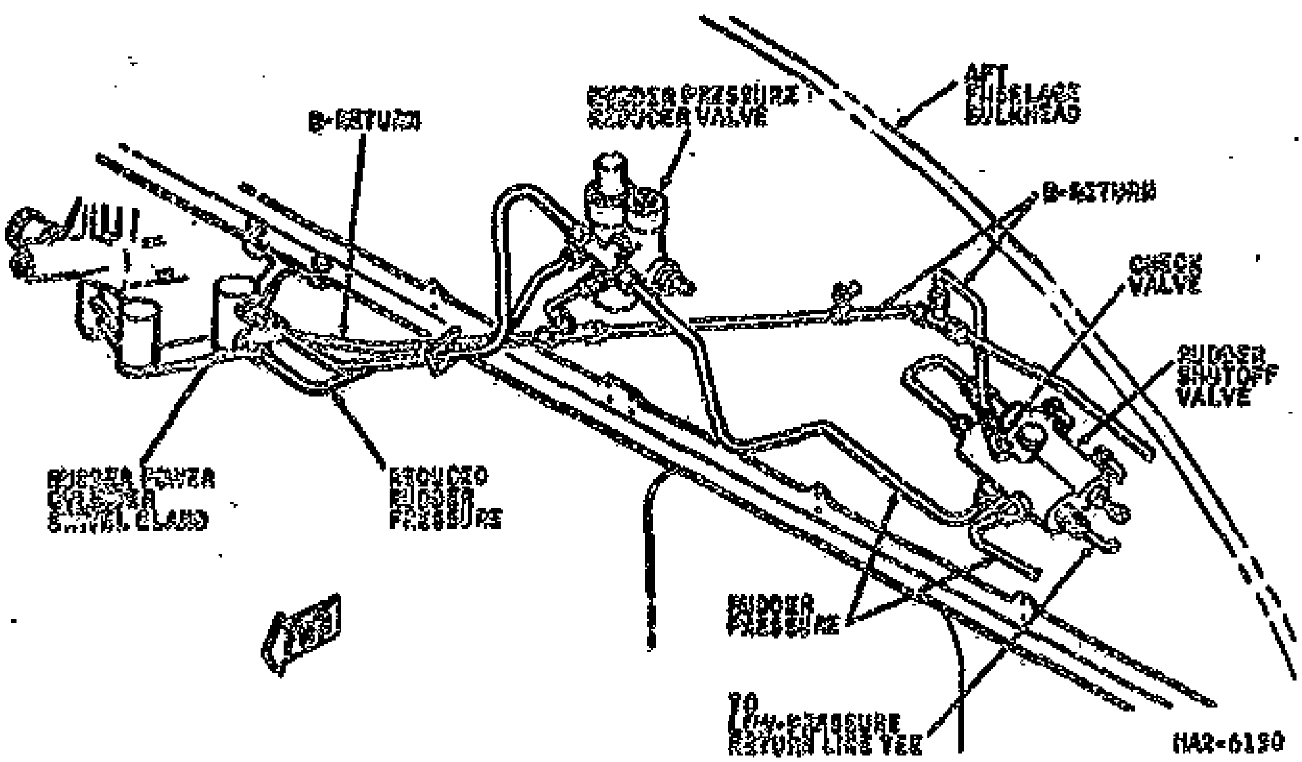
(7) At rudder shutoff valve, disconnect low-pressure return line from tee and connect to test stand return hose.

(8) At same valve, Step (7), disconnect pressure-in line and pressure-out line. Place jumper across two lines.

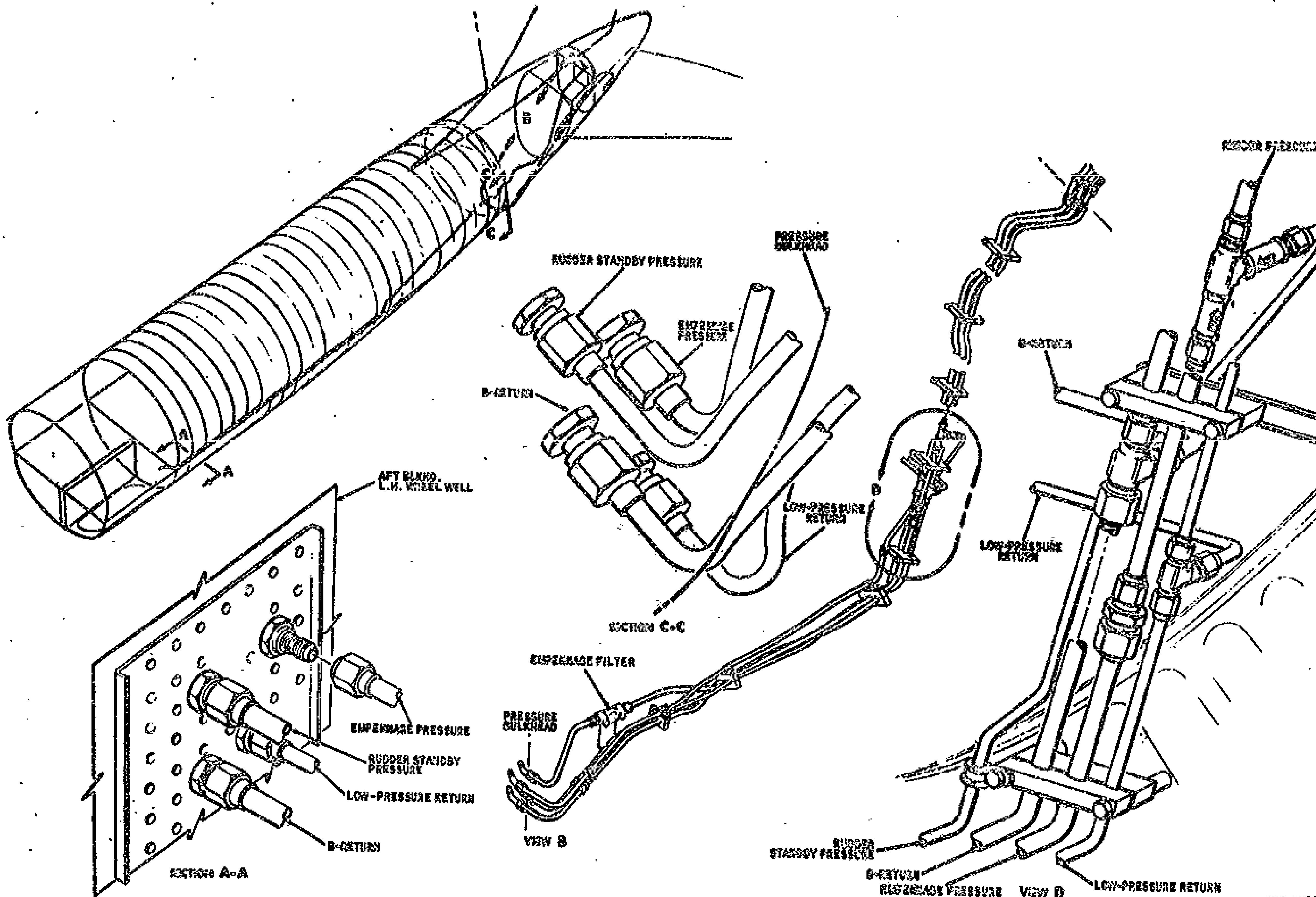
(9) Disconnect line from pressure reducer valve to tee in return line. Cap tee.

(10) At tee in pressure reducer valve, disconnect both pressure lines and connect together with jumper.

(11) Disconnect reduced pressure line from pressure reducer valve, and disconnect pressure line from restrictor check valve in rudder power cylinder swivel gland. Place jumper across these two open lines.




Flushing Procedure Line Connection Locations
Figure 601




Flushing Procedure Line Connection Locations
Figure 602

(12) Disconnect reduced pressure line from check valve in swivel gland, and disconnect return line from swivel gland. Place jumper across these two lines.

(13) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(14) Flush circuit for five minutes.

(15) Depressurize test stand.

(16) Inspect, clean, and/or replace rudder shutoff valve, pressure reducer valve, rudder power control cylinder, swivel gland, and all removed check valves and restrictors.

(17) Restore all lines and units to original configuration, and make any necessary adjustments per Chapter 27.

C. Horizontal Stabilizer Trim System

(1) Disconnect three stabilizer trim lines from tees in rudder power system lines.

(2) Place jumper across B-return and low-pressure return lines.

(3) Connect open pressure line to test stand pressure hose.

(4) Disconnect low-pressure return line from trim motor control valve cross fitting. Disconnect B-return line from control valve. Disconnect pressure line from shutoff valve.

(5) Connect jumper between open pressure line, and open B-return line.

(6) Connect open low-pressure return line to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for three minutes.

(9) Depressurize test stand.

(10) Inspect, clean, and/or replace hydraulic trim motor-brake, valves, and associated piping.

(11) Restore all lines and units to original configuration.

# SPOILER SYSTEM - INSPECTION/CHECK

## 1. General

A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the spoiler system by flushing the system with clean hydraulic fluid.

B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather then recirculated through the hydraulic test stand.

D. Before any flushing procedures are performed, personnel should read and thoroughly understand Section 29-00, Inspection/Check.

## 2. Tools and Equipment Required

A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

## 3. Flush Spoiler System

A. Spoiler Power System to Filter

(1) After bleeding pressure and hydraulic fluid from spoiler system reservoir, disconnect bypass hose and pressure hose from bottom of pump. Connect two hoses together with union.

(2) At reservoir, disconnect suction hose and case drain hose. Jumper these two hoses together.

(3) Disconnect suction line from pump and connect to test stand pressure hose.

(4) Disconnect both pressure lines at tee in accumulator. Place jumper across these lines.

(5) At relief valve just forward of filter, disconnect pressure line from upper tee, and disconnect return line from forward side of bottom tee. Place jumper across open lines.

(6) Disconnect return line from tee in reservoir, and connect open line to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

(10) Inspect, clean, and/or replace accumulator, and two relief valves (one at reservoir and one at filter).

(11) Clean out filter bowl and replace element.

(12) Clean out reservoir and refill with clean fluid after connecting all lines and units. Restore system to original configuration.

B. Spoiler Supply System Filter to Units

(1) Disconnect pressure line from check valve in spoiler system filter. Connect line to test stand pressure hose.

(2) Disconnect interconnect pressure line from tee in spoiler system pressure line. Cap tee.

(3) Following pressure line to next tee, disconnect line which runs forward. Cap tee.

(4) At pressure bulkhead tee fitting in center web (tee which supplies outboard spoiler pressure to both sides of airplane), disconnect line which runs to right. Cap tee.

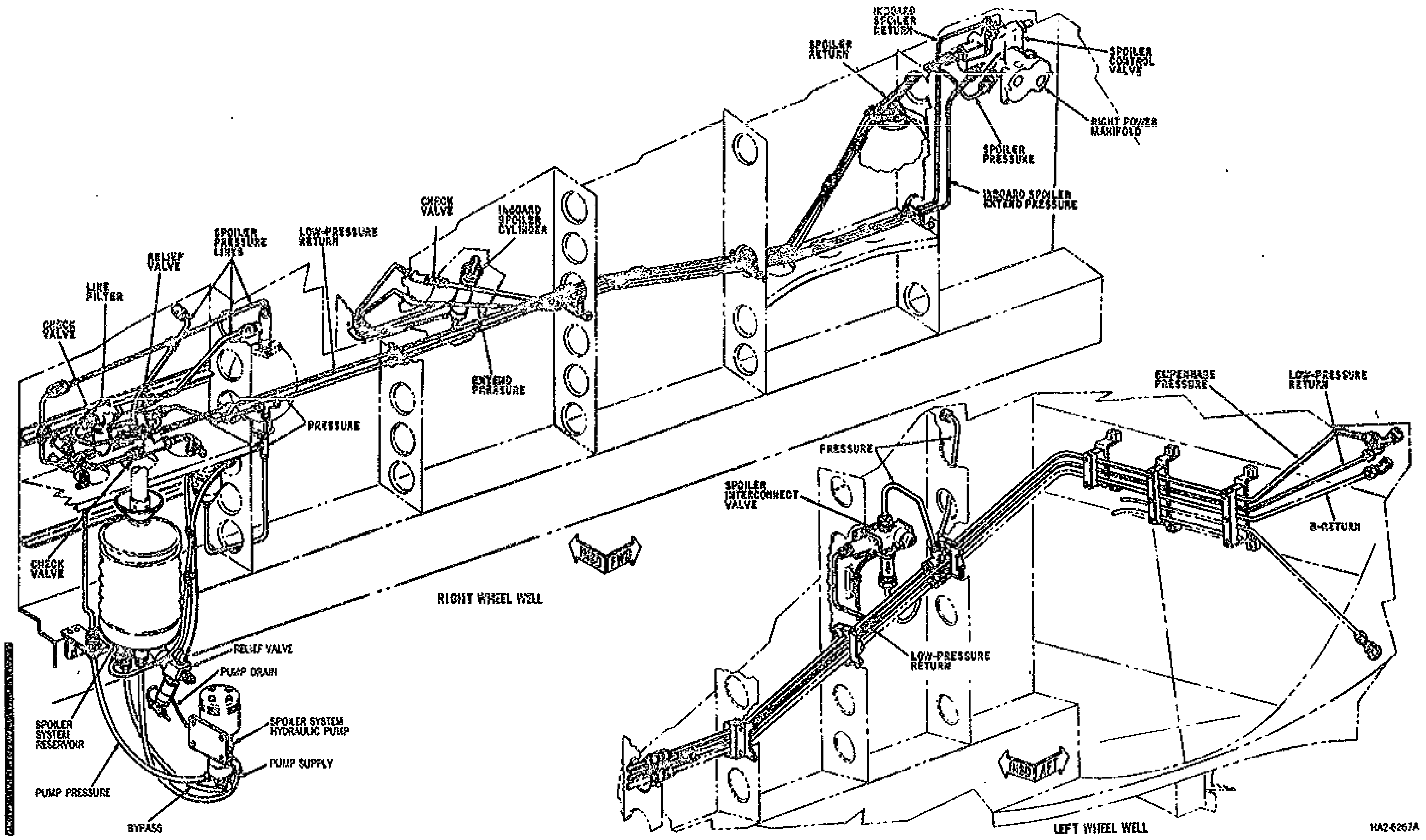
(5) At STA $X_{rs}$ = approx. 217 on both sides of airplane, disconnect spoiler pressure and return lines from spoiler glands. Place jumpers between these lines on both sides of airplane.

(6) At tee in return bulkhead tee, located just under pressure bulkhead tee mentioned in Step (4), disconnect both lines which run forward. Cap tee and place jumper across two lines.

(7) Disconnect return line from check valve in tee at bottom of system pressure relief valve. Connect this line to line disconnected in Step (4) with jumper.

(8) At spoiler valve, located on right power manifold, disconnect spoiler return line. From same manifold, disconnect spoiler pressure line. Connect these two lines together with jumper.

(9) Connect jumper line to line which was disconnected in Step (3). In same line at next tee forward, disconnect line which leads down to pressure transmitter and reservoir. Cap tee and connect open line to other end of jumper.




Flushing Procedure Line Connection Locations
Figure 601

(10) Disconnect reservoir pressurization line from tee in pressure line. Disconnect pressure line from pressure transmitter. Connect two open lines with jumper, and cap tee.

(11) Disconnect reservoir pressurization line from bottom of reservoir, and connect line to test stand return hose.

(12) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(13) Flush circuit for five minutes.

(14) Depressurize test stand.

(15) Inspect, clean, and/or replace check valves in the filter, and in bottom of relief valve.

(16) Restore all lines and units to original configuration.

C. Outboard Spoiler System

(1) At STA $X_{FS}$ = approx. 217, inspect, clean, and/or replace outboard spoiler cylinder and valve assembly, and connecting swivel glands.

(2) Restore all lines and units to their original configuration, and make any necessary adjustments per Chapter 27.

D. Inboard Spoiler System

(1) Disconnect extend and retract lines from spoiler control valve, located on right power manifold in right wheel well. Connect extend line to test stand pressure hose. Connect retract line to test stand return hose.

(2) On right side of the center web, replace restrictor in spoiler retract line with jumper.

(3) In rear of left wheel well, disconnect extend and retract lines from inboard spoiler cylinder. Place jumper across open lines.

(4) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand.

(7) Inspect, clean, and/or replace spoiler control valve, two restrictors, and actuating cylinder.

(8) Restore all lines and units to original configuration, and make necessary adjustments per Chapter 27.

M. [illegible] Interconnect System

(1) In right wheel well, disconnect interconnect line from tee in spoiler system pressure line, located near spoiler system filter. Connect this line to test stand return hose.

(2) In left wheel well, disconnect three lines leading into solenoid interconnect valve, mounted on center web. Leave check valve with solenoid valve.

(3) Connect jumper between line disconnected from check valve and line disconnected from pressure port.

(4) Disconnect solenoid valve low-pressure return line from tee in empennage low-pressure return line. Connect this line to test stand pressure hose.

(5) Disconnect solenoid valve pressure line from tee in empennage pressure line. Connect this line to disconnected case drain line in solenoid interconnect valve with jumper.

(6) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Inspect, clean, and/or replace solenoid interconnect valve, and check valve.

(10) Restore all lines and units to original configuration.

## SPOILER SYSTEM - INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the spoiler system by flushing the system with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand Section 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Spoiler System

   A. Spoiler Power System to Filter

      (1) After bleeding pressure and hydraulic fluid from spoiler system reservoir, disconnect bypass hose and pressure hose from bottom of pump. Connect two hoses together with union.

      (2) At reservoir, disconnect suction hose and case drain hose. Jumper these two hoses together.

      (3) Disconnect suction line from pump and connect to test stand pressure hose.

      (4) Disconnect both pressure lines at tee in accumulator. Place jumper across these lines.

      (5) At relief valve just forward of filter, disconnect pressure line from upper tee, and disconnect return line from forward side of bottom tee. Place jumper across open lines.

(6) Disconnect return line from tee in reservoir, and connect open line to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

(10) Inspect, clean, and/or replace accumulator, and two relief valves (one at reservoir and one at filter).

(11) Clean out filter bowl and replace element.

(12) Clean out reservoir and refill with clean fluid after connecting all lines and units. Restore system to original configuration.

B. Spoiler Supply System Filter to Units

(1) Disconnect pressure line from check valve in spoiler system filter. Connect line to test stand pressure hose.

(2) Disconnect interconnect pressure line from tee in spoiler system pressure line. Cap tee.

(3) Following pressure line to next tee, disconnect line which runs forward. Cap tee.

(4) At pressure bulkhead tee fitting in center web (tee which supplies outboard spoiler pressure to both sides of airplane), disconnect line which runs to right. Cap tee.

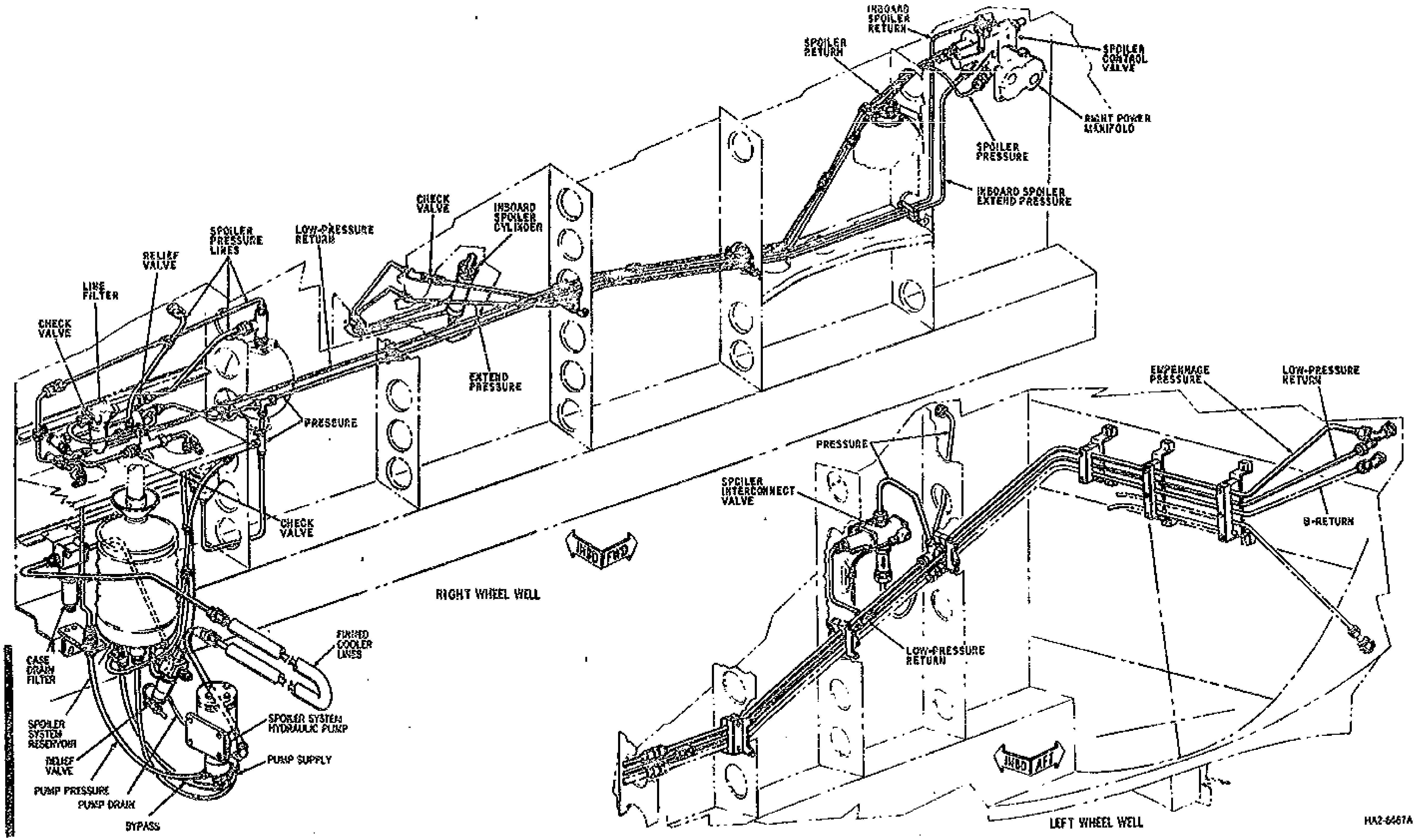
(5) At STA $X_{rs}$ = approx. 217 on both sides of airplane, disconnect spoiler pressure and return lines from spoiler glands. Place jumpers between these lines on both sides of airplane.

(6) At tee in return bulkhead tee, located just under pressure bulkhead tee mentioned in Step (4), disconnect both lines which run forward. Cap tee and place jumper across two lines.

(7) Disconnect return line from check valve in tee at bottom of system pressure relief valve. Connect this line to line disconnected in Step (4) with jumper.

(8) At spoiler valve, located on right power manifold, disconnect spoiler return line. From same manifold, disconnect spoiler pressure line. Connect these two lines together with jumper.

(9) Connect jumper line to line which was disconnected in Step (3). In same line at next tee forward, disconnect line which leads down to pressure transmitter and reservoir. Cap tee and connect open line to other end of jumper.




Flushing Procedure Line Connection Locations
Figure 601

(10) Disconnect reservoir pressurization line from tee in pressure line. Disconnect pressure line from pressure transmitter. Connect two open lines with jumper, and cap tee.

(11) Disconnect reservoir pressurization line from bottom of reservoir, and connect line to test stand return hose.

(12) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(13) Flush circuit for five minutes.

(14) Depressurize test stand.

(15) Inspect, clean, and/or replace check valves in the filter, and in bottom of relief valve.

(16) Restore all lines and units to original configuration.

C. Outboard Spoiler System

(1) At STA $X_{rs}$ = approx. 217, inspect, clean, and/or replace outboard spoiler cylinder and valve assembly, and connecting swivel glands.

(2) Restore all lines and units to their original configuration, and make any necessary adjustments per Chapter 27.

D. Inboard Spoiler System

(1) Disconnect extend and retract lines from spoiler control valve, located on right power manifold in right wheel well. Connect extend line to test stand pressure hose. Connect retract line to test stand return hose.

(2) On right side of the center web, replace restrictor in spoiler retract line with jumper.

(3) In rear of left wheel well, disconnect extend and retract lines from inboard spoiler cylinder. Place jumper across open lines.

(4) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand.

(7) Inspect, clean, and/or replace spoiler control valve, two restrictors, and actuating cylinder.

(8) Restore all lines and units to original configuration, and make necessary adjustments per Chapter 27.

B. The Interconnect System

(1) In right wheel well, disconnect interconnect line from tee in spoiler system pressure line, located near spoiler system filter. Connect this line to test stand return hose.

(2) In left wheel well, disconnect three lines leading into solenoid interconnect valve, mounted on center web. Leave check valve with solenoid valve.

(3) Connect jumper between line disconnected from check valve and line disconnected from pressure port.

(4) Disconnect solenoid valve low-pressure return line from tee in empennage low-pressure return line. Connect this line to test stand pressure hose.

(5) Disconnect solenoid valve pressure line from tee in empennage pressure line. Connect this line to disconnected case drain line in solenoid interconnect valve with jumper.

(6) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(7) Flush circuit for five minutes.

(8) Depressurize test stand.

(9) Inspect, clean, and/or replace solenoid interconnect valve, and check valve.

(10) Restore all lines and units to original configuration.

## RUDDER STANDBY HYDRAULIC POWER SYSTEM - INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the rudder standby hydraulic power system by flushing the system with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal of overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before and flushing procedures are performed, personnel should read and thoroughly understand Section 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedures.

3. Flush Rudder Standby Hydraulic Power System

   A. Rudder Standby Power System To Filter

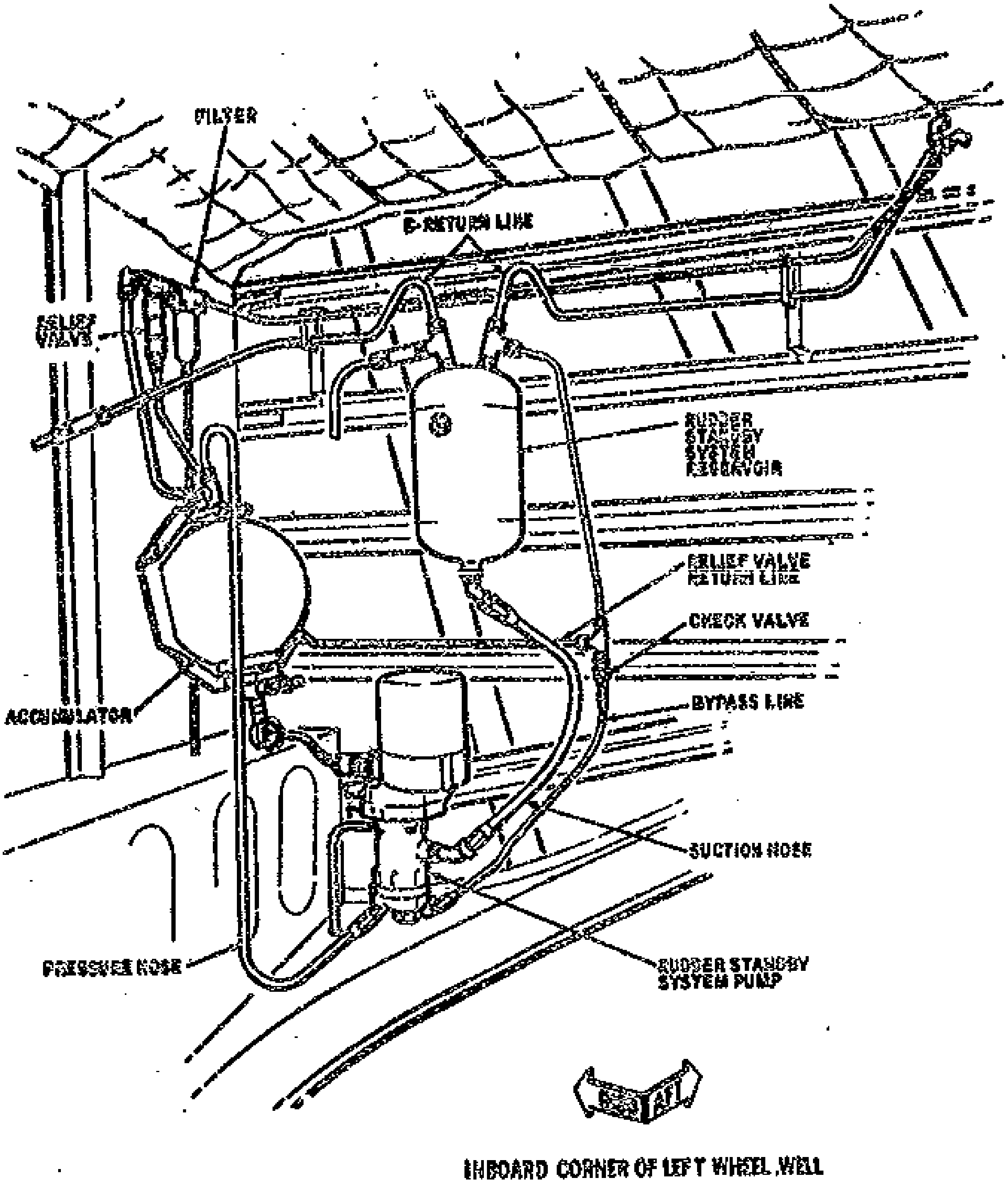
      (1) In left wheel well, disconnect two B-return lines and bypass line from two tees in top of rudder standby system reservoir. Cap both openings in tee that had received bypass line.

      (2) Connect opening in other tee to test stand pressure hose.

      (3) Disconnect three hoses from rudder standby system pump. Connect suction hose to pressure hose.

      (4) Disconnect 1/4-inch pressure line from tee in top of rudder standby system accumulator, and disconnect line in bottom of relief valve. Install jumper between these two lines.

      (5) Disconnect relief valve return line and bypass line from tee fitting (with check valve). Use bypass hose as jumper between these two lines.




Flushing Procedure Line Connection Locations
Figure 601

(6) Connect bypass line, which was disconnected in Step (1), to test stand return hose.

(7) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(8) Flush circuit for five minutes.

(9) Depressurize test stand.

(10) Inspect, clean, and/or replace the pump, accumulator, filter, relief valve, and check valve.

(11) Restore all lines and units to original configuration.

B. Rudder Standby Power Interconnect Line (Filter To Empennage Normal Power Line)

(1) In left wheel well, disconnect rudder standby system pressure line from downstream side of filter. Connect this line to test stand pressure hose.

(2) In aft end of the airplane, disconnect rudder standby pressure line from check valve in tee located in normal rudder pressure line.

(3) This line may be attached directly to test stand return with long hose, or section of empennage return line may be connected into circuit for use with shorter test stand return hose.

(4) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(5) Flush circuit for five minutes.

(6) Depressurize test stand.

(7) Inspect, clean, and/or replace check valve mentioned in Step (2).

(8) Restore all lines and units to original configuration.

## THRUST REVERSER SYSTEM - INSPECTION/CHECK

1. General

   A. The purpose of this section is to provide a logical guide for removing the contaminates (foreign particles) from the fluid, units, and lines of the thrust reverser system by flushing the system with clean hydraulic fluid.

   B. This procedure may be deviated from as dictated by the individual circumstances. Hydraulic circuits that are easy to locate and follow, have been intentionally omitted from this procedure for the sake of brevity.

   C. The removal overheated or diluted fluid, would follow generally the same procedure with the exception that the removed contaminated fluid would be caught in containers rather than recirculated through the hydraulic test stand.

   D. Before any flushing procedures are performed, personnel should read and thoroughly understand Section 29-00, Inspection/Check.

2. Tools and Equipment Required

   A. One hydraulic test stand capable of operating with Skydrol hydraulic fluid, and fitted with a 10-micron or smaller filter.

   B. Pressure and return hoses, jumper lines, and fittings as required by the following procedure.

3. Flush Thrust Reverser System

   A. Thrust Reverser Pressure and Return Lines to Actuator Cylinders

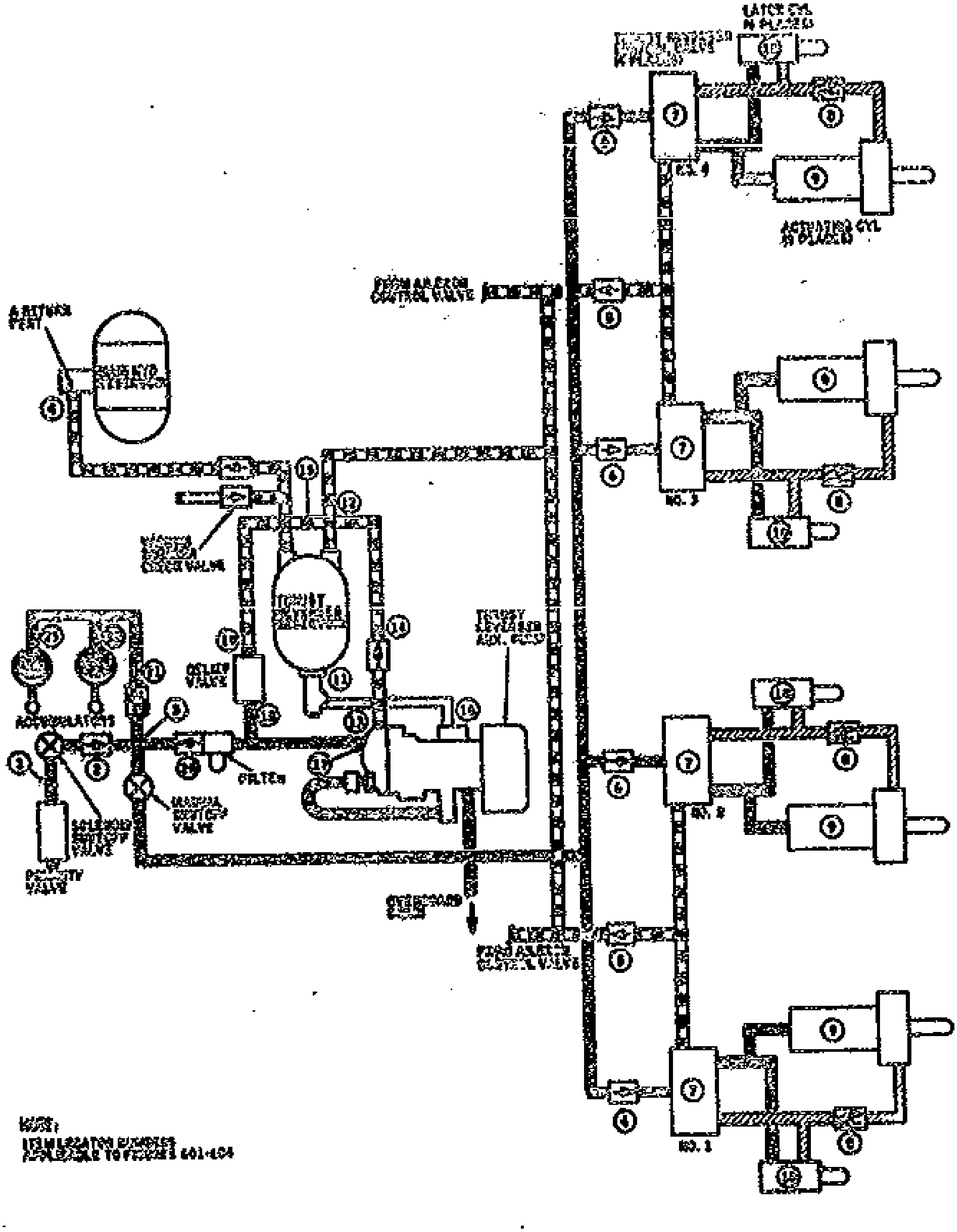
      (1) Disconnect thrust reverser pressure line from cross fitting or tee (as applicable) below priority valve in left main gear wheel well. Cap fitting and connect test stand pressure hose to reverser pressure line.

      (2) Disconnect inlet and outlet lines from thrust reverser solenoid valve and check valve located below priority valve. Jumper lines and make certain that manual shutoff valve is open.

      (3) At cross fitting just aft of manual shutoff valve, disconnect auxiliary pump pressure line and accumulator pressure line. Cap cross fitting ports.

      (4) Drain main hydraulic reservoir to a point below return ports manifold. (See 29-00, Maintenance Practices).

      (5) At main hydraulic reservoir, disconnect A return line from tee fitting above auxiliary pump relief valve.



Flushing Procedure Line Connection Locations
Figure 601

(6) Connect test stand return hose to A return line.

(7) Disconnect and jumper check valve in A return line adjacent to thrust reverser reservoir in left wing root area.

NOTE: The thrust reverser pressure and return lines follow the rear spar outboard from the fuselage to the number 2 and number 3 pylons, and then forward within the pylons, to the front spar where the lines are teed and follow the front spar to the number 1 and number 4 pylons.

(8) Aft of rear spar at number 2 pylon, remove and jumper thrust reverser return line check valve.

(9) In number 1 pylon, remove and jumper pressure line check valve located above thrust reverser latch cylinder.

(10) Disconnect four lines from thrust reverser control valve.

(11) Jumper thrust reverser pressure line to thrust reverser stow line and thrust reverser return line to thrust reverser extend line.

(12) Remove and jumper restrictor in actuator cylinder stow line.

(13) Disconnect and jumper extend and stow lines to thrust reverser actuator cylinder.

(14) Disconnect and jumper extend and stow lines to thrust reverser latch cylinder.

(15) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(16) Flush circuit for five minutes.

(17) Depressurize test stand.

(18) Inspect, clean, and/or replace thrust reverser control valve, actuating cylinder, latch cylinder, pylon pressure line check valve, and stow line restrictor.

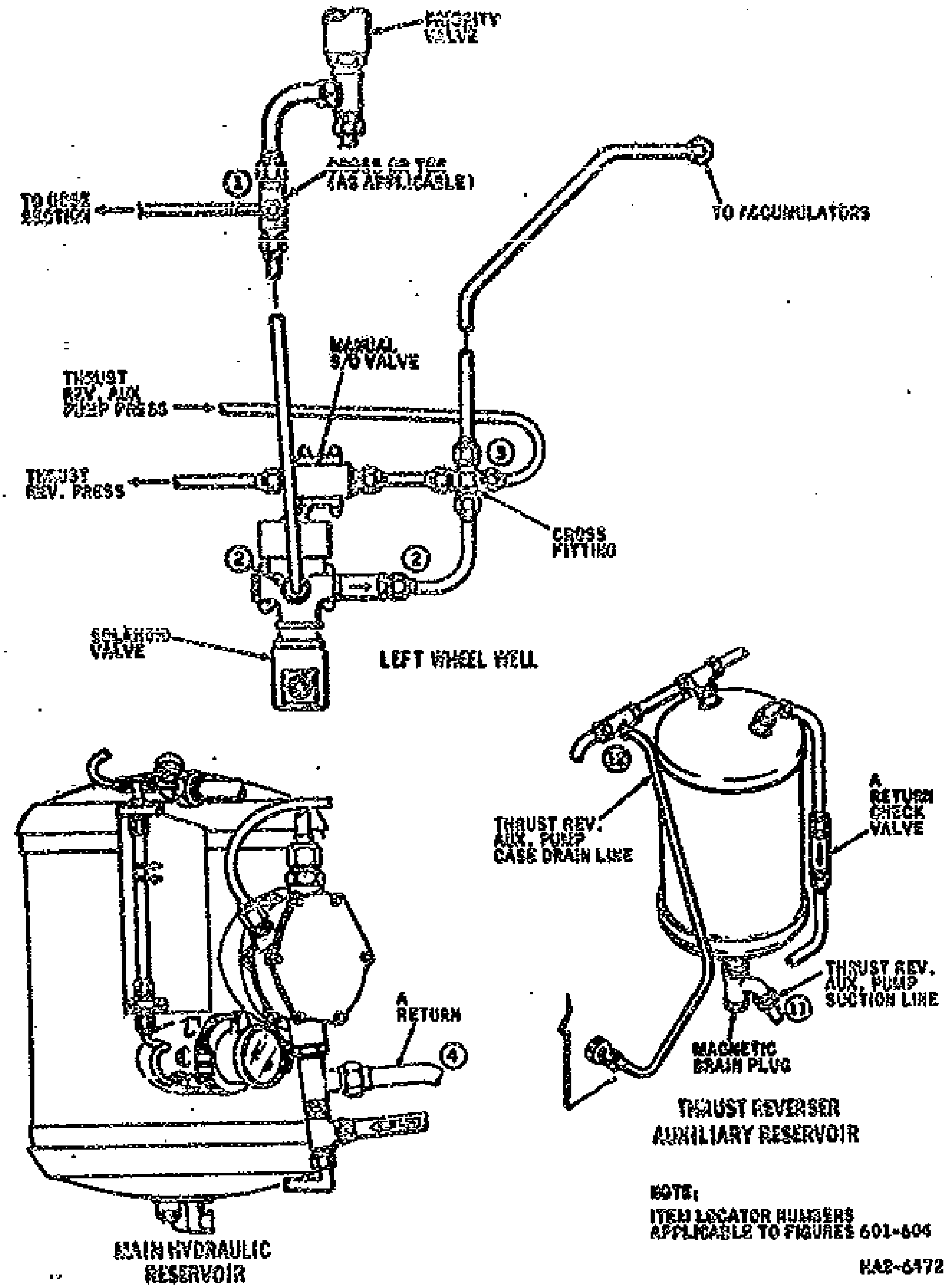
(19) Restore all lines and units in number one pylon to original configuration.

(20) Repeat steps (9) through (19) for number 2 pylon.

(21) Inspect, clean, and/or replace return line check valve aft of number 2 pylon.

(22) Aft of rear spar at number 3 pylon, remove and jumper thrust reverser return line check valve.

(23) Repeat steps (9) through (19) for number 4 pylon.




Flushing Procedure Line Connection Locations
Figure 602

(24) Repeat steps (9) through (19) for number 3 pylon.

(25) Inspect, clean, and/or replace return line check valve aft of number 3 pylon, thrust reverser solenoid valve, pressure line check valve at solenoid valve outlet, and A return line check valve.

(26) Restore all lines and units to original configuration except cross fitting disconnected in step (3).

B. Thrust Reverser Auxiliary Pump and Accumulator Lines

(1) Remove magnetic drain plug from thrust reverser reservoir and drain reservoir. Clean plug, reinstall and safety with lock wire (see Chapter 78).

(2) Disconnect thrust reverser auxiliary pump suction line from bottom of thrust reverser auxiliary reservoir.

(3) Disconnect pump case drain line at tee near top of auxiliary reservoir.

(4) Jumper case drain line to suction line.

(5) At thrust reverser auxiliary pump, disconnect case drain hose.

(6) Connect test stand pressure hose to case drain hose.

(7) Disconnect, remove, and jumper case drain check valve located at outboard end of case drain hose.

(8) Disconnect relief valve return line at tee at outboard end of case drain hose. Cap tee.

(9) Disconnect auxiliary pump suction hose at pump and connect test stand return hose to suction hose.

(10) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(11) Flush circuit for five minutes.

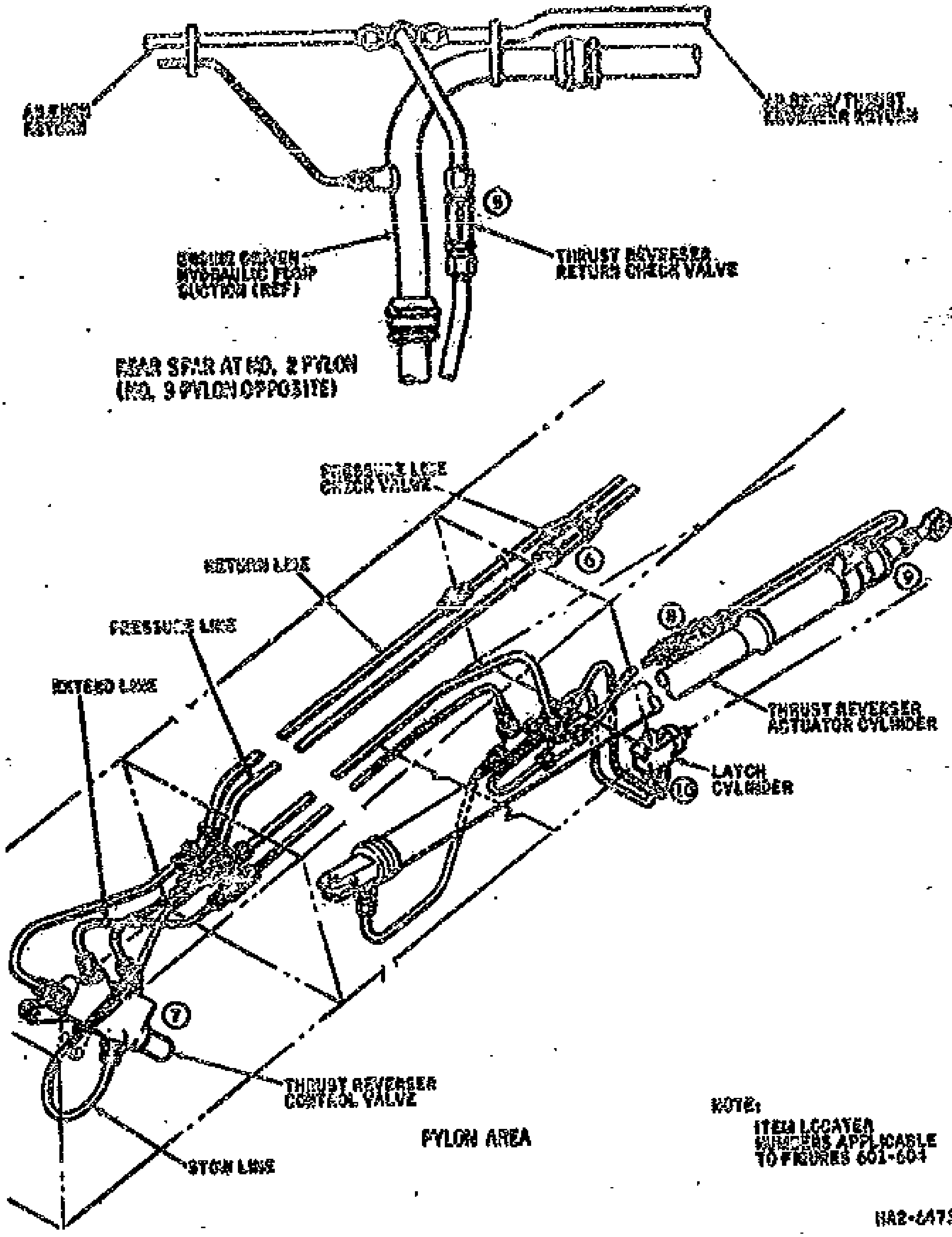
(12) Depressurize test stand.

(13) Disconnect test stand pressure hose from case drain hose.

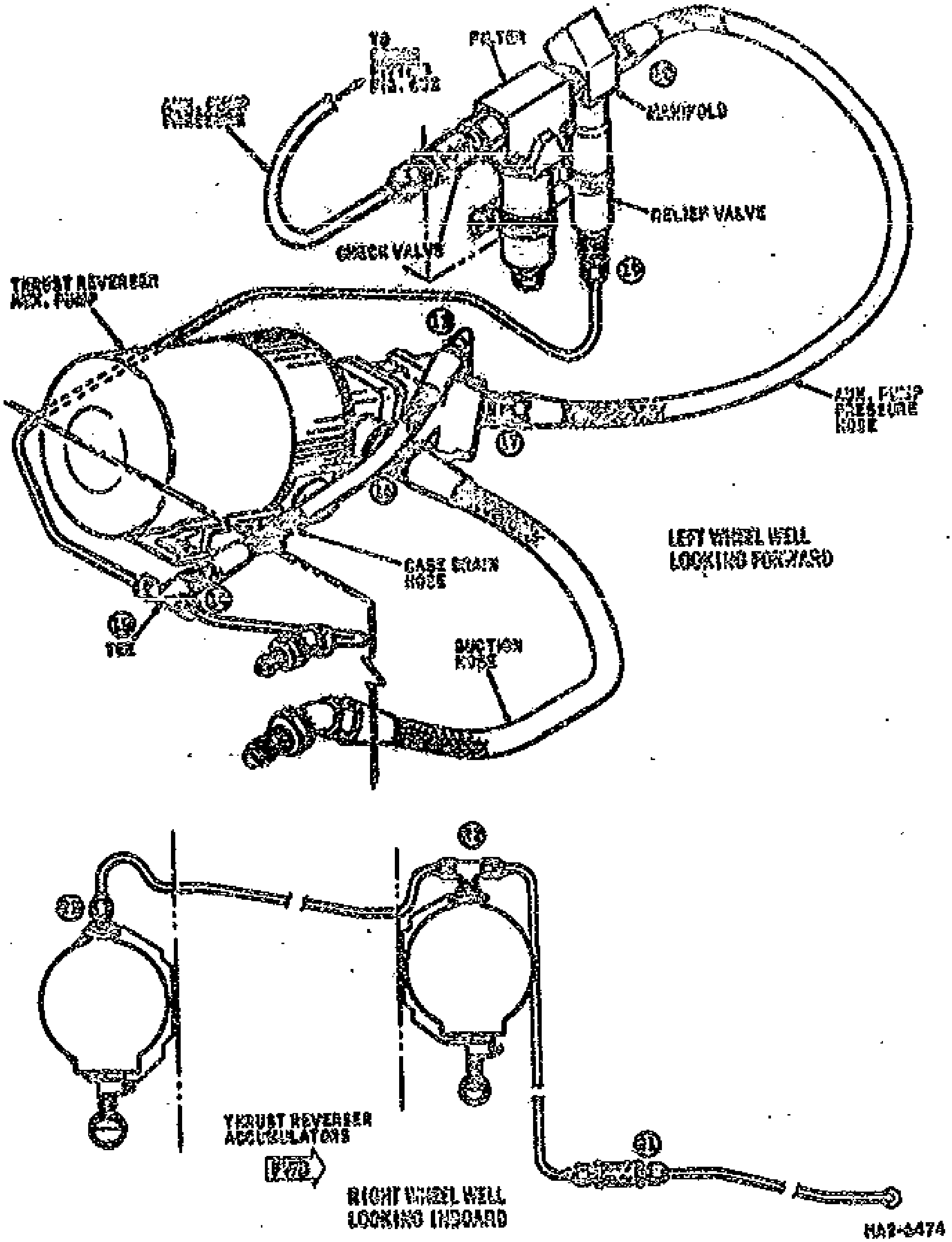
(14) Disconnect auxiliary pump pressure hose from pump and connect test stand pressure hose to auxiliary pump pressure hose.

(15) Disconnect downstream end of auxiliary pump pressure hose from relief valve manifold.

(16) Disconnect relief valve return line from bottom of relief valve and jumper to pressure hose disconnected in step (15).




Flushing Procedure Line Connection Locations
Figure 603




Flushing Procedure Line Connection Locations
Figure 604

(17) Disconnect pump pressure line from outlet check valve on auxiliary pump filter. Jumper this line to open end of relief return line disconnected in step (8).

(18) Connect test stand return hose to auxiliary pump pressure line disconnected from cross fitting in step A(3).

(19) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(20) Flush circuit for five minutes.

(21) Depressurize test stand.

(22) Disconnect test stand return hose from auxiliary pump pressure line at cross fitting and connect return hose to thrust reverser accumulator line disconnected in step A(3).

(23) In right main gear wheel well, disconnect and jumper restrictor located in thrust reverser pressure line just below and forward of thrust reverser accumulators.

(24) Disconnect and jumper pressure lines at tee on forward accumulator.

(25) Disconnect pressure line from aft accumulator.

(26) Disconnect test stand pressure hose from auxiliary pump pressure hose in left wheel well and connect to accumulator pressure at aft accumulator.

(27) Pressurize test stand to 200 psi maximum at 20 gpm flow.

(28) Flush circuit for five minutes.

(29) Depressurize test stand.

(30) Inspect, clean and/or replace thrust reverser auxiliary pump, filter, relief valve, check valves, restrictor, and accumulators.

(31) Restore all lines and units to original configuration.

# TEMPORARY REVISION 29-3

FILING INSTRUCTIONS: Insert this Temporary Revision following 29-08, CODE 1, Page 608, Inspection/Check, or in microfilm supplement by Chapter/Section/Subject.

This Temporary Revision cancels and supersedes Temporary Revision 29-1. Remove Temporary Revision 29-1 from Maintenance Manual.

Retain this Temporary Revision until notified to remove it.

DESCRIPTION AND REASON: This Temporary Revision adds paragraph B. and Figure 602 for the leakage rates for the applied and not applied aircraft brakes.

EFFECTIVITY: ALL

## MAIN HYDRAULIC POWER SYSTEM - INSPECTION/CHECK

1. General

   A. For allowable hydraulic fluid leakage rates with hydraulic system pressurized (see Figure 601).

| SEAL | ALLOWABLE LEAKAGE FOR NORMAL OPERATIONS (REF. NOTE) | ALLOWABLE LEAKAGE FOR DISPATCH OPERATION (REF. NOTE) |
|---|---|---|
| (1) TUBE CONNECTIONS | NO VISIBLE EVIDENCE OF LEAKAGE. | NO VISIBLE EVIDENCE OF LEAKAGE. |
| (2) STATIC SEALS | 1 DROP PER 10 MINUTES | DETERMINED BY OPERATOR |
| (3) DYNAMIC SEALS: | | |
| (a) ENGINE-DRIVEN PUMP | 10 DROPS PER MINUTE | 20 DROPS PER MINUTE. CORRECT AT FIRST OPPORTUNITY. |
| (b) ELECTRIC MOTOR-DRIVEN PUMPS | 10 DROPS PER MINUTE | 20 DROPS PER MINUTE. CORRECT AT FIRST OPPORTUNITY. |
| (c) OTHER DYNAMIC SEALS UNDER STATIC CONDITIONS AT FULL OR PARTIAL PRESSURE | 1 DROP PER 10 MINUTES | 5 DROPS PER MINUTE. CORRECT AT FIRST OPPORTUNITY. |
| (d) OTHER SEALS UNDER DYNAMIC CONDITIONS | 1 DROP PER CYCLE | 5 DROPS PER CYCLE. CORRECT AT FIRST OPPORTUNITY. |
| (e) ALTERNATE PER PUMP | 10 DROPS PER MINUTE ALLOWABLE FOR NORMAL OPERATION | 20 DROPS PER MINUTE ALLOWABLE FOR DISPATCH. CORRECT AT FIRST OPPORTUNITY. |

NOTE: LEAKAGE RATES ARE BASED ON THERE BEING APPROXIMATELY 20 DROPS PER CUBIC CENTIMETER AND/OR 75,600 DROPS PER GALLON. COMPONENT LEAKAGE TO BE MEASURED DURING OPERATION.

ALLOWABLE HYDRAULIC FLUID LEAKAGE RATES
(Hydraulic System Pressurized)
Figure 601

B. For allowable hydraulic fluid leakage rates on Brake Hydraulic System (see Figure 602).

| | SEAL | ALLOWABLE LEAKAGE FOR NORMAL OPERATIONS | ALLOWABLE LEAKAGE FOR DISPATCH OPERATION |
|---|---|---|---|
| (1) | AIRCRAFT BRAKES APPLIED (PRESSURIZED) | NO VISIBLE LEAKAGE | DOES NOT EXCEED 5 DROPS PER MINUTE. CORRECT AT FIRST OPPORTUNITY. |
| (2) | AIRCRAFT BRAKES NOT APPLIED (NOT-PRESSURIZED) | NO VISIBLE LEAKAGE | DOES NOT EXCEED 1 DROP PER MINUTE. CORRECT AT FIRST OPPORTUNITY. |

ALLOWABLE HYDRAULIC FLUID LEAKAGE RATES
(Hydraulic System Pressurized and Not Pressurized)
Figure 602